DOCUMENT RESUME

ED 061 063 SE 013 395

TITLE	Quest for Quality, Conservation Yearbook No. 1.
INSTITUTION	Department of the Interior, Washington, D.C.
PUB DATE	65
NOTE	99p.
AVAILABLE FROM	Superintendent of documents, Government Printing Office, Washington, D.C. 20402 ($1.00)
EDRS PRICE	MF-$0.65 HC Not Available from EDRS.
DESCRIPTORS	*Agency Role; *Annual Reports; Conservation Education; *Environment; *Federal Programs; Management; *Natural Resources; Photocomposition; Program Descriptions; Yearbooks

ABSTRACT

Presented in this 1964 yearbook are highlights of the work done by the various bureaus and offices of the Department of the Interior. Coverage is broad, relating to many aspects of conservation in the United States in a descriptive, non-technical style. Some of the topics considered include the quality of living; recreation, water, mineral, fuel, land, fish, and wildlife resources; research programs; human needs and resources; and Department management. Numerous graphics, colored and black and white pictures enhance the narration. (BL)

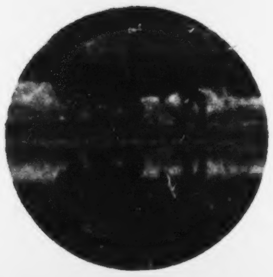
Quest *for* Quality

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

ED 061063

SE 013 395

U.S. Department of the Interior Conservation Yearbook



Quest *for* Quality

Photo by Richard Beattie

CONSERVATION YEARBOOK | PUBLISHED BY THE UNITED STATES DEPARTMENT OF THE INTERIOR, OFFICE OF THE SECRETARY

Contents

Page

4 Road to the Future
17 Reins for a Raindrop
29 The Pause That Recreates
41 From Under the Earth
46 The Earth Itself
55 To Each His Place
63 Exploring New Paths
73 To Meet Human Needs
86 Keeping the House in Order
92 The Endless Search

COLOR:

The loan of the majority of the color separations used in this publication has made the color printing possible. The Department of the Interior wishes to express its appreciation to the following firms and individuals for these donations: Country Beautiful Foundation, Elm Grove, Wis., publishers of the book "America the Beautiful" and the magazine "Country Beautiful"; Eastman Kodak Co., Rochester, N.Y.; Kimberly-Clark Corp., Neenah, Wis.

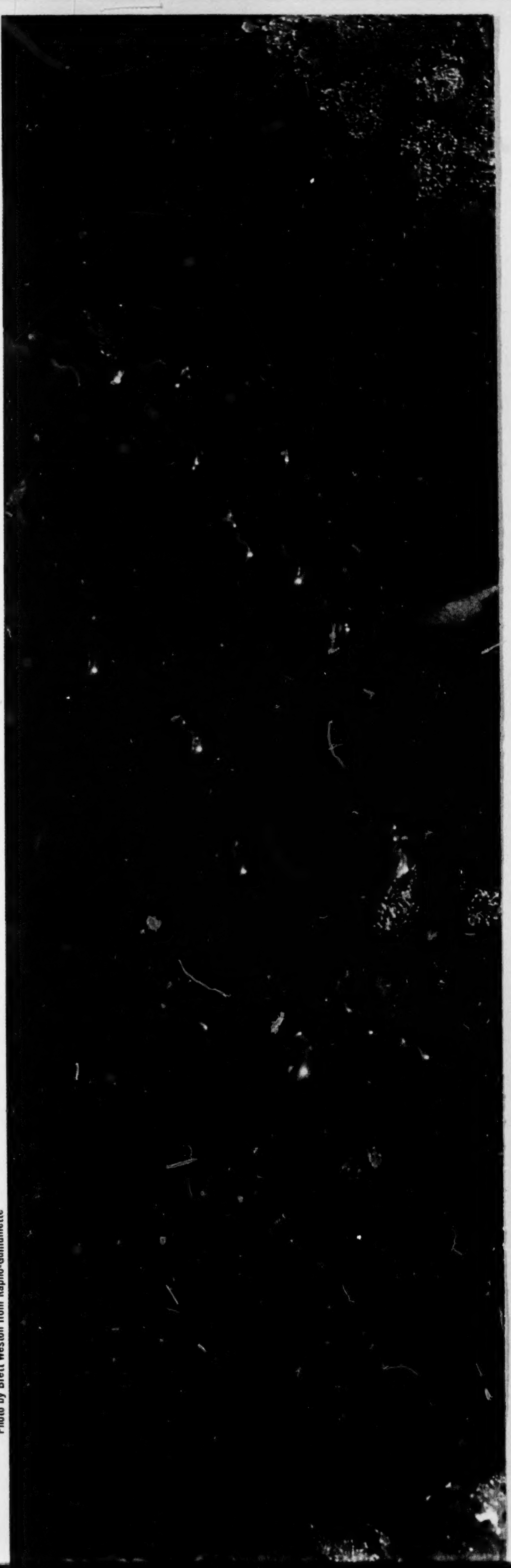
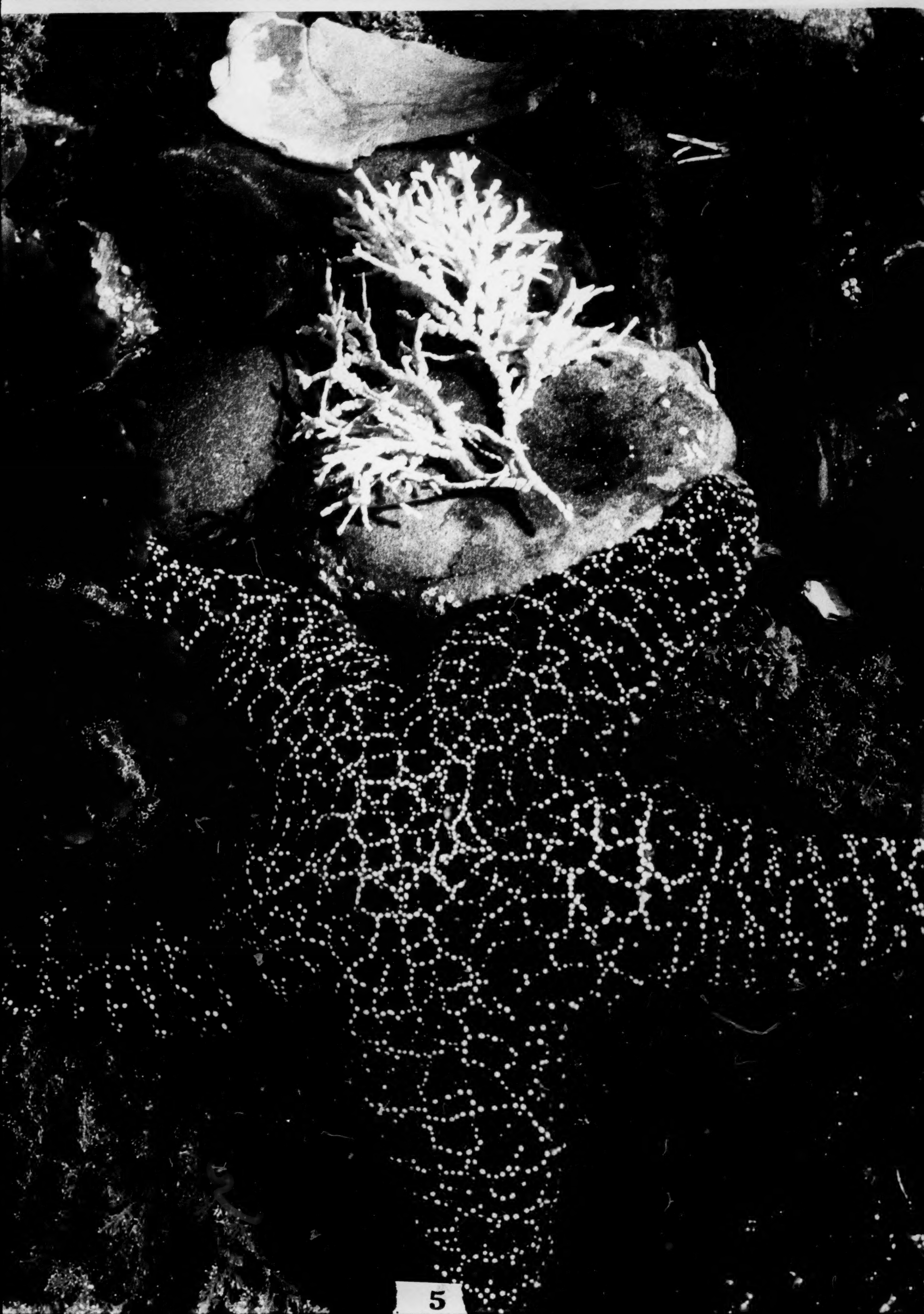


Photo by Brett Weston from Rapho-Guillumette



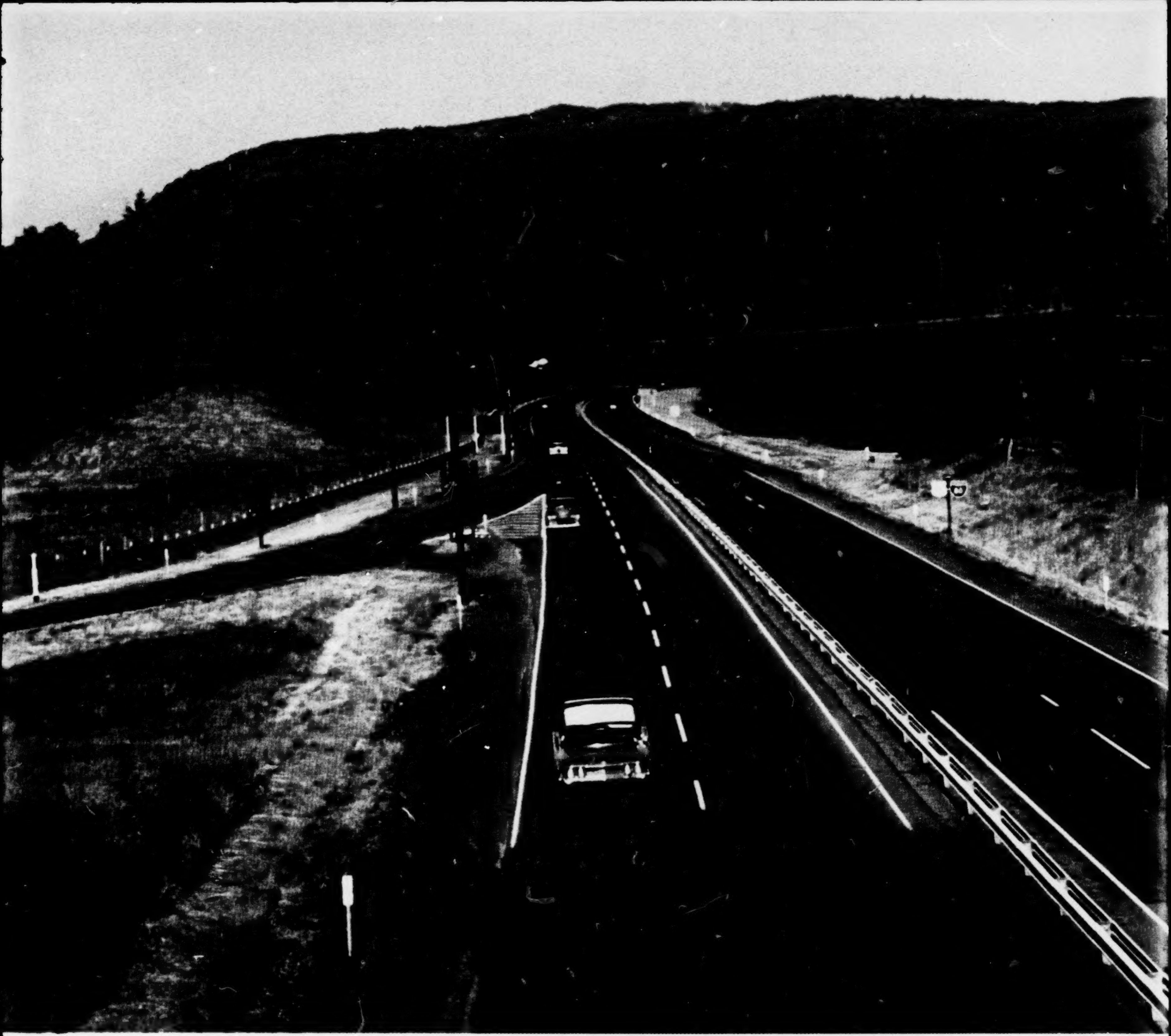
5

Road to the Future

"Our resource problems in the 1960's are measured by the flyway of a bird, the length of a river, the half-life of an element, the path of a wind, the scope of the oceans, the shape of our cities. The years ahead will require both public and private conservation statesmanship of a high order."

Stewart L Udall

Secretary of the Interior



The busy shuttle of civilization is weaving the pattern of our society with increasing speed. As roads lace the land, we must blend beauty with utility or sacrifice quality to chaos.

One road there is which every living thing must travel—the road to the future. The choice of where it will lead still seems to lie with us, but no one can say with certainty that this is so.

The road to the future is enigmatic, springing into being only as we set our feet to it . . . revealing itself only as it becomes the past . . . visible only in the rear view mirror of history. Yet even though we must walk it under these handicaps, we have learned to read certain signposts of the past and present. How we react to these may well determine whether we march uphill to what President Johnson has called the Great Society or take the downward path to mediocrity.

Today we face perhaps the gravest—certainly the most stimulating—challenge in the history of conservation. It is the challenge to build a quality society—one in which we manage not just to preserve the delicate balance between the needs of our people and the natural resources of our land, but actually to improve the heritage which has been handed to us.

The historian looking back on our moment in time may note that the United States of America reached its golden days in the mid-20th century with respect to the equilibrium between needs and resources. From this truly bountiful land we have drawn amply to satisfy our material needs. The incomparable machine civilization, which we alternately enjoy and endure, has reached its current peak because we have had the resource wherewithal to draw on, to develop, to convert and build and bend to our will.

So far, our history has recorded two great thrusts, or attitudes, with relation to our natural recources and now we are entering a third. In the beginning, Nature was a reluctant treasure. We fought to tame and subdue and then to exploit her bounty. Usage was the key word in those earliest days,

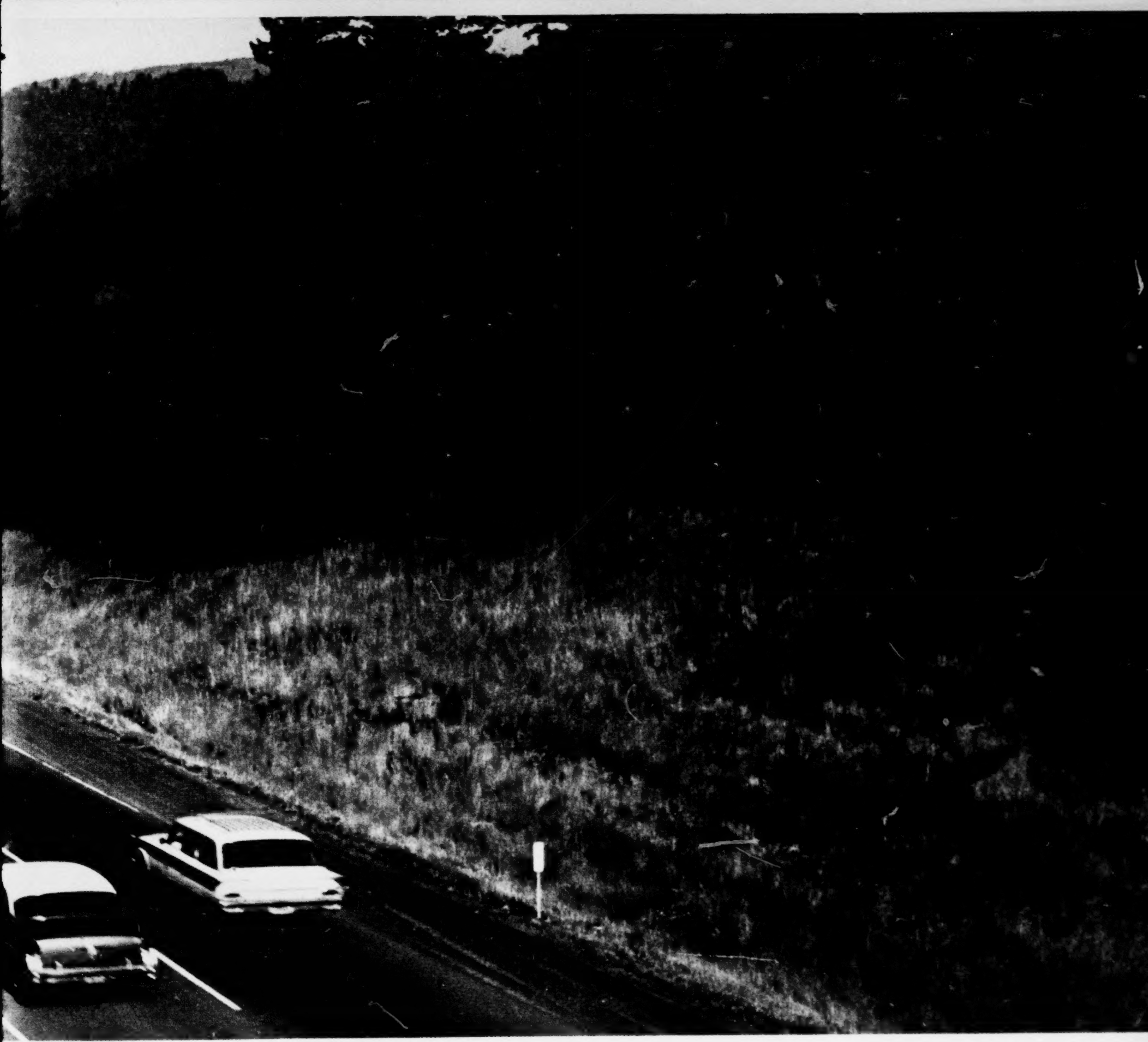
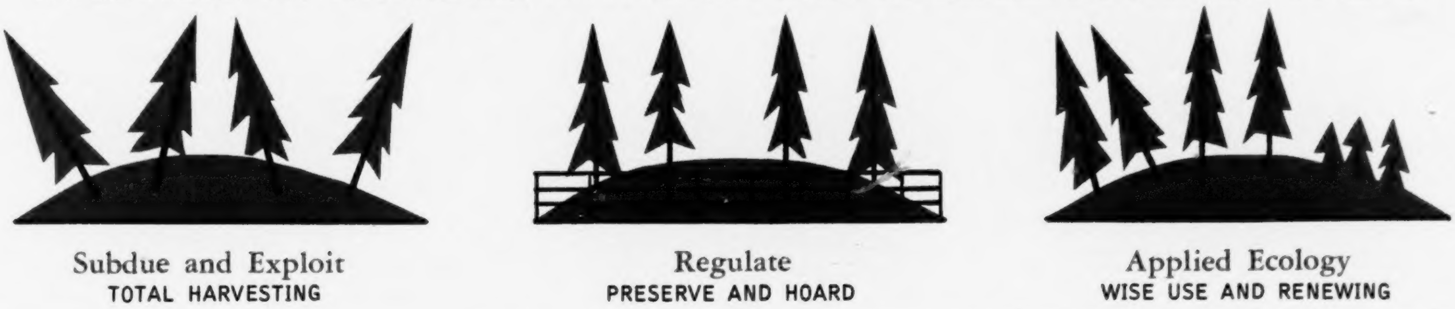


Photo by Ray Atkeson

and the men who prospered were those who mastered Nature's secrets—on the land, in the waters and under the earth. For mastery meant power, and this Nation was bent on becoming strong.

In the early part of this century came the first conservation thrust. It was the period of Theodore Roosevelt and it climaxed a scholarly and scientific movement that had its origins in the 19th century work of men like Marsh, Hough and Schurz. The tone was strongly preservationist and antimonopolistic and it resulted in the start of public management and

EVOLUTION OF NATIONAL ATTITUDES AND NATURAL RESOURCES POLICY


Subdue and Exploit
TOTAL HARVESTING
Regulate
PRESERVE AND HOARD
Applied Ecology
WISE USE AND RENEWING

Trees have given way to the gravel

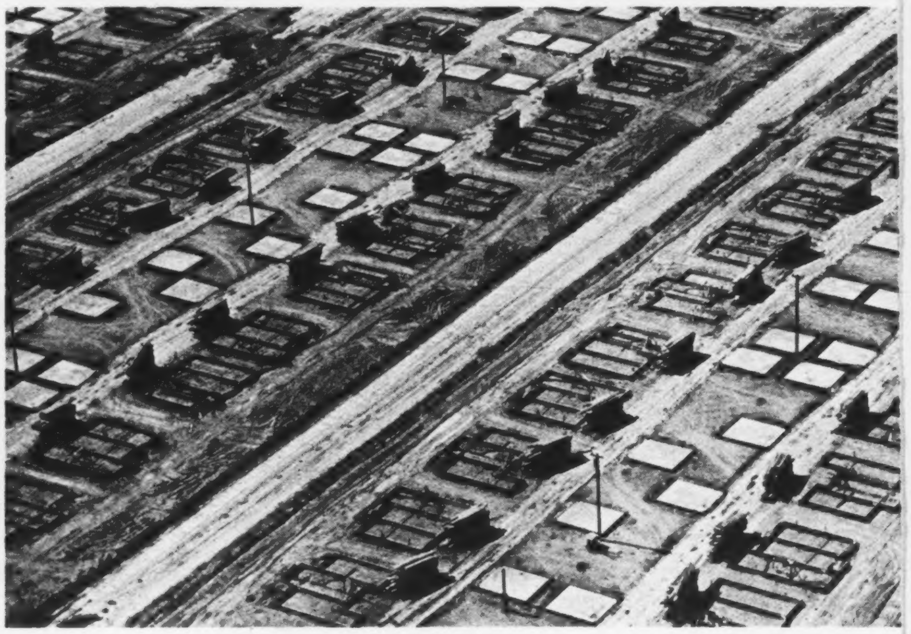
the regulatory phase. Its origins were largely in the cities of the East and much of the stimulus came from the wholesale destruction of forests in the East and of wildlife in the West and South.

The second great forward movement came with F. D. R. and the New Deal. The conservation of resources during this time became an instrument of economic recovery of regional and national growth, and later of defense buildup.

The third wave came with the Kennedy-Johnson Administration. From the beginning of World War II through the post-war retooling, natural resources policies and programs were of low priority. In 1961, President Kennedy redefined national resource policies and gave direction to a program of new starts on a wide front. The program instituted at this time broadened the policies of previous administrations; the concept of conservation of single resources gave way to one of preserving and developing the American environment—using fully the tools of modern science.

Today we face the future with every sign urging us to reassess the material base on which we must support our exploding population. In an earlier period of our history we held it wise and necessary to wrest the riches from our surroundings. Later it behooved us to preserve, protect, even to hoard our natural resources. Today we find conservation challenging not our muscles, but our minds.

No longer can we afford to cluster our conservationists into clubs. The concept of conservation cannot be isolated on little islands of awareness. It must become universally accepted as a familiar, taken-for-granted part of everyday life. Only thus can the "golden days balance" we now enjoy be preserved.



Wood and soil once meant a tree—

shoulder, the industrial complex, and the billboard

Mobil
JUST AHEAD
AAA
TY
TER
HOTEL

The new direction conservation is taking has been defined as "applied ecology," which means living things and how they relate to their total environment. It means stretching our resources to cover the demands of a growing population and still observing the rightful claims of the inhabitants of many an obscure "ecological niche."

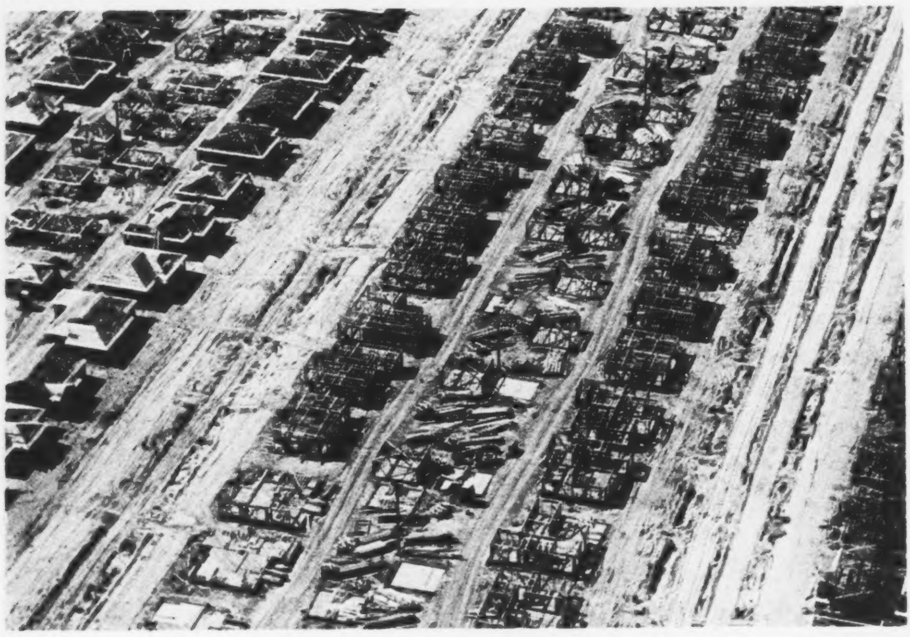
It means not just the setting aside of priceless and irreplaceable natural treasures and the wisest multiple use of renewable resources, but an honest attempt to understand the relationship of all creatures—from the tiniest organisms in the chain of life to the lords of creation which we fondly imagine to be ourselves. The integrity of this chain is becoming increasingly apparent. Our exalted position atop the pyramid of life is secure only if the base is allowed to remain broad and varied.

Thoughtfully and surely this Nation's caretakers are arriving at new programs designed not just to remedy our yesterdays, but to enhance our tomorrows.

The program of wise and prophetic stewardship being forged today is both careful and daring. Conceived on a truly national scale, it is deeper than soil conservation, broader than wildlife preservation, more penetrating than forest husbandry, more encompassing than control of air and water pollution.

Against a backdrop of unplanned sprawl and planned ugliness, two Presidents have moved to develop important new measures designed to bring order and meaning into the overall conservation picture. The pieces are being picked up and put together to form a picture where every living creature and the total environment which sustains it has a rightful place and a recognized right to occupy that place.

Water, iron ore, copper—these are among the basic resources



The relationship of wood to land is changing drastically

The cry of the sanderling is drowned out

Photo by M. Woodbridge Williams

fundamental to a modern machine civilization. During 1964, our population will use approximately 118 trillion gallons of water, 132 million tons of iron ore, and 1.5 million tons of copper. This same population will, in its lifetime, require about 6.3 quadrillion gallons of water, 7.3 billion tons of iron ore, and 90 million tons of copper.

But the population that will make these demands on our national wealth will not remain static. And each additional person adds a yearly drain of 600,000 gallons of water, 1,260 pounds of iron ore, and 15.6 pounds of copper.

Statistics such as these have an impact largely meaningless unless translated into some kind of comparative terms. The picture comes into sharper focus when we say that the total amounts of water, copper, and iron needed just to sustain the present U.S. population for the remaining years of their lives is larger than the totals used by *all* the men, women, and children who previously lived on this earth.

When we start projecting future needs we must take into consideration some harrowing misguesses of the recent past. The U.S. Bureau of the Census in 1947 predicted that this Nation would have "a population of 145 million in 1950, of 153 million in 1960 and possibly 163 million by 1990." In actuality, by 1960 the U.S. census takers counted 179,323,000 noses. Today, with the population past the 192 million

12

by the roar of an exploding population

mark, projectors are putting our country's tenancy at 288 million by 1990 or 123 million *more* than the 1947 projection for 1990. For the year 2010, the estimate now ranges from 322 million to 438 million. The drain on resources a population this size will demand staggers the mind.

Fresh water is among the more serious needs of this Nation and the world. The day is rapidly approaching when the clouds simply will not be adequate as purveyors of water. In certain areas we have overdrawn our underground water accounts. We are damming our rivers and are working toward the day when we will have wrung every iota of industrial, municipal, irrigation, hydroelectrical, and recreational use from the water where it can be caught and channeled.

New approaches are essential. The next wave of population must depend increasingly on intensive recycling of used water and desalination of salt and brackish water. With water, as with fuels, minerals and other resources, Interior is at work—using every appropriate tool of science, every concept of intellect, every spark of intuition, to push the frontiers of conservation into new and creative areas.

The boundaries of our task are suddenly universal. For quality cannot be contained within the confines of a wildlife preserve, any more than blight could be contained on the other side of the tracks. Our environment is truly "of a piece"

MAGNIFICENT ADVENTURE!
LILLI PALMER
RKO-PALACE

Photo by Jim Lee

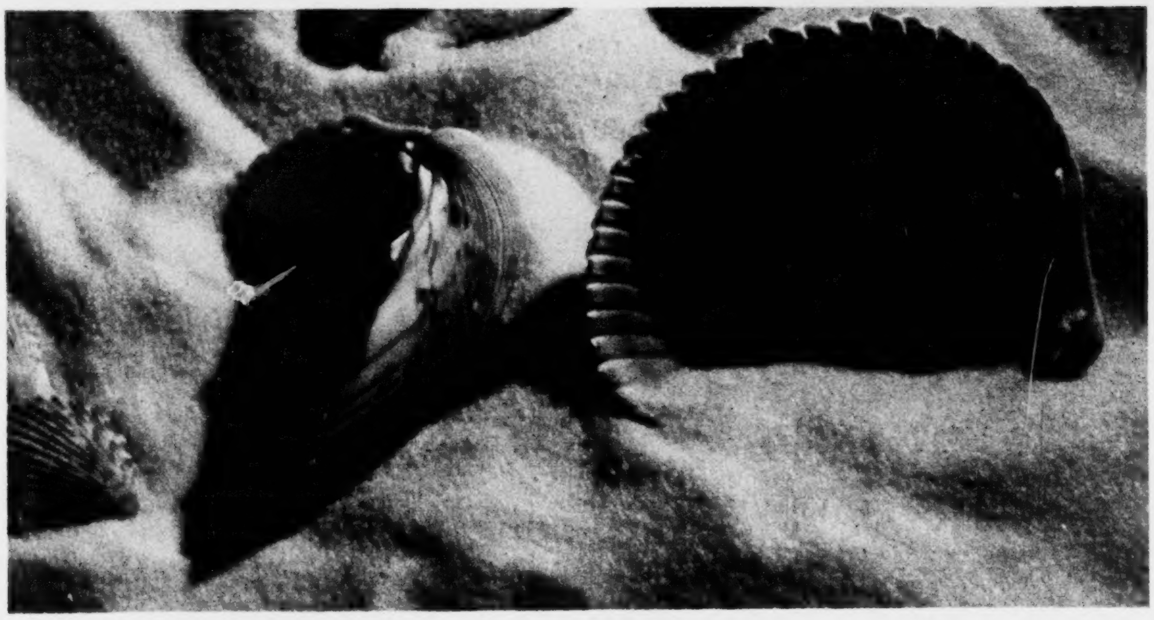
In city or countryside, on land, air, or water— Everywhere we face The horrors of pollution

today and no amount of smug superiority will protect one shining section of it against the rot that lurks in another corner of the environmental fabric.

Conservation has come in from the forests and the mountains and the country side and sat itself down in front of the city hall. In our urban jungles the tracks go everywhere; and blight, which crossed the tracks masquerading as progress, goes with them. The quality of our urban environment is very much a part of the total conservation picture today as more and more of our people abandon rural life and flock to the cities. The pall of polluted air which is the plane passenger's signal that he is approaching a large city almost anywhere on earth is spreading grime on every exposed surface. This same grime is sucked into the lungs of city-dwellers, where it deposits itself in a coating whose consequences we do not yet fully comprehend.

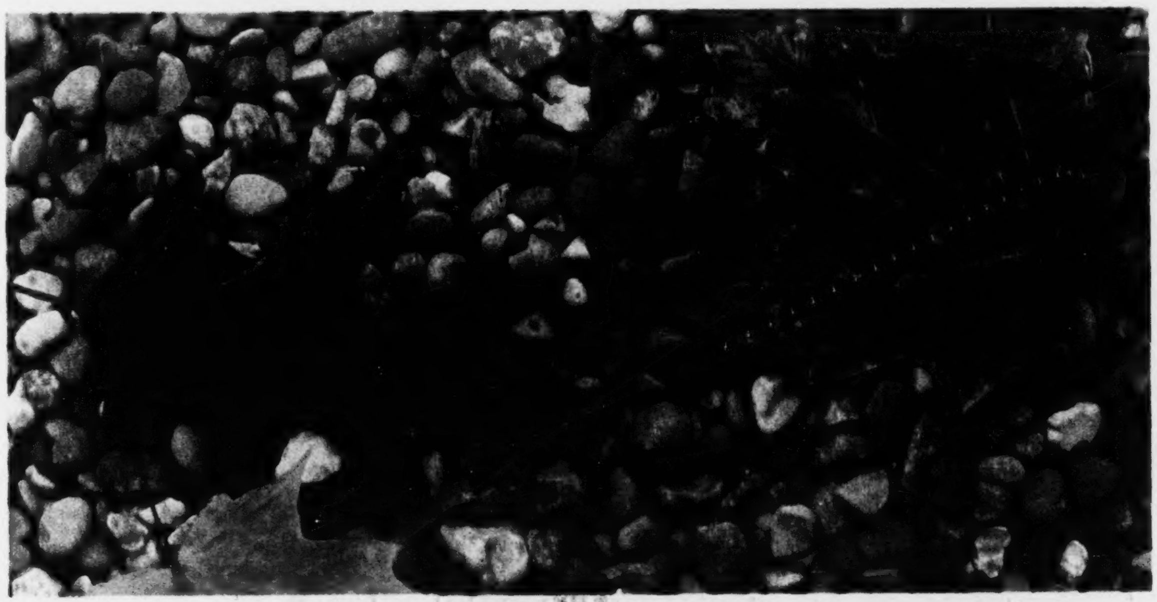
Slowly, there is dawning in man an understanding of the intertwined cause and effect pattern which makes him subject, in some small way, to every slightest tampering with his total environment. If he is to enjoy the fruits of a truly Great Society, he must be willing to work for quality everywhere, not just in his own back yard; he must consider not just the fumes from his own car, but the total exhaust cloud from the Nation's vehicles; he must wonder not just where his next drink of water is coming from, but what is being done to keep the world's taps from going dry.

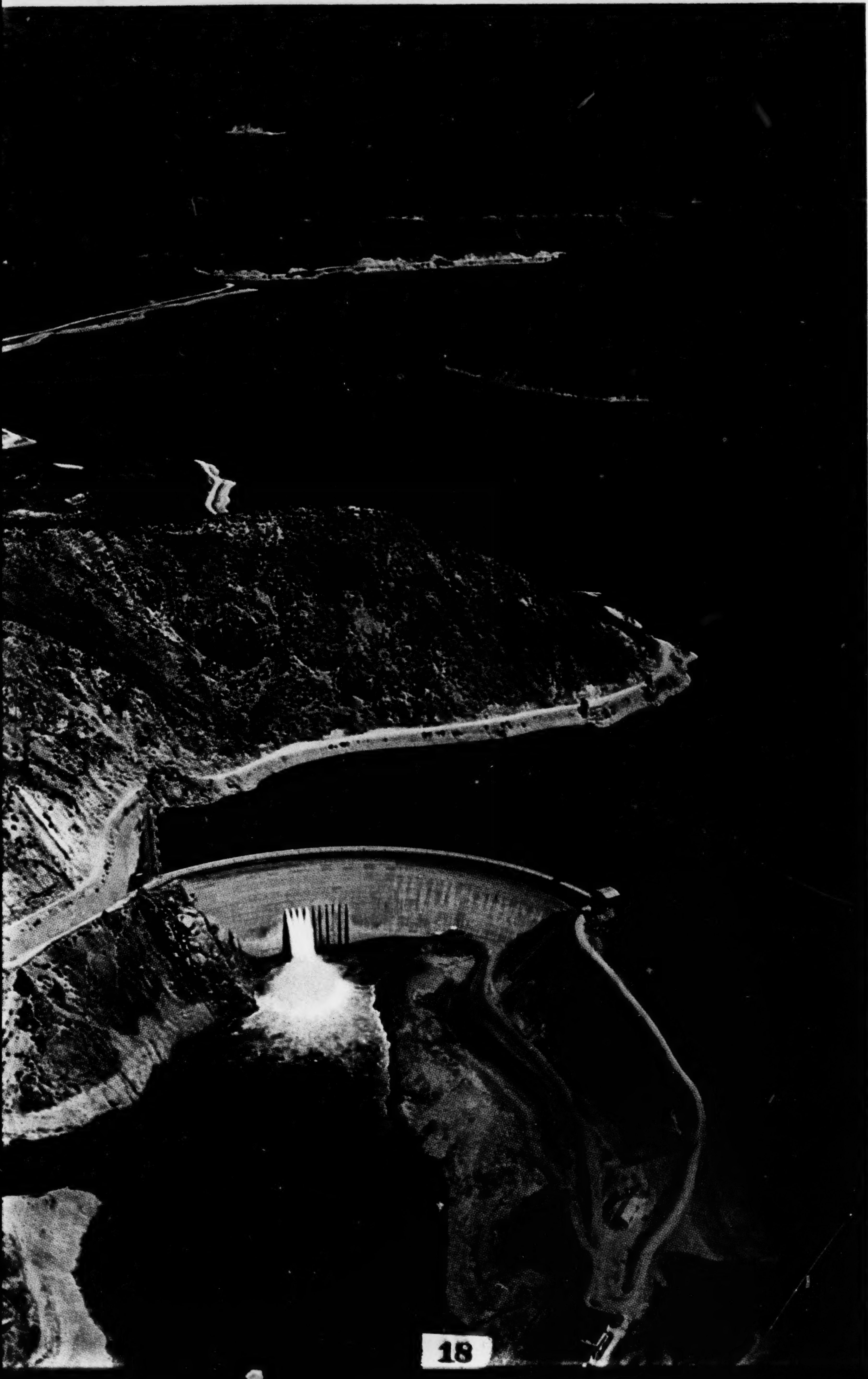
The challenge of this quest for quality is awesome. But the Great Society is an inspiring goal. The limits of the most creative conservation we can muster will be tested in the striving; but we are already committed to our best. President Johnson has said it:



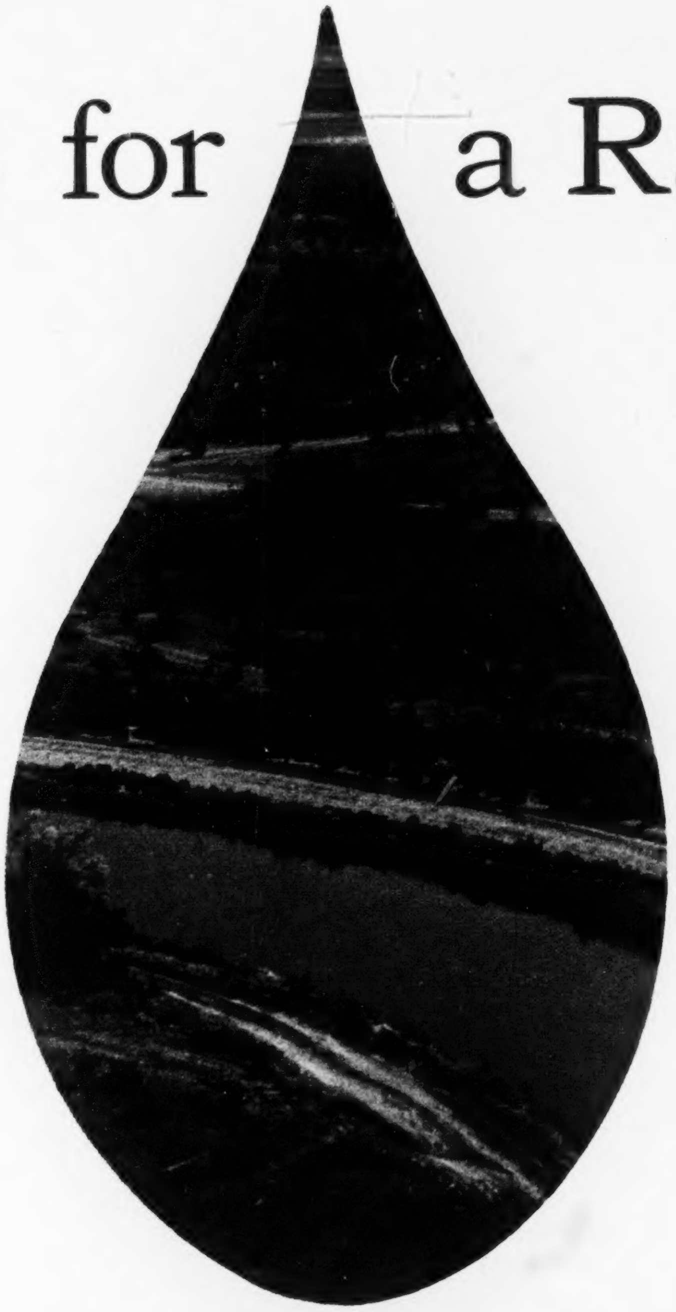
"The Great Society is a place where men are more concerned with the quality of their goals than with the quantity of their goods. But most of all, the Great Society is not a safe harbor, a resting place, a final objective, a finished work. It is a challenge constantly renewed, beckoning us toward a destiny where the meaning of our lives matches the marvelous products of our labor."

Lyndon B. Johnson





Reins for a Raindrop



Reclamation projects, such as the Arrowrock Dam in Idaho, insure clean water to serve all the needs of an area.

Water—Our single most important resource

Raindrops resist a harness, and for aeons man has been at the mercy of water's whim. The fortunes of empires have risen and fallen with the water table. The phrase "tide of fortune" carries within it an acknowledgment of the dependence of man on this essential liquid asset.

Yet in spite of the sophisticated control weaponry furnished us by science, water today has the dubious distinction of being America's most misused resource.

With the Pacific Southwest confronting a deepening water crisis, with nearly all our waterways befouled by sewage, silt, industrial wastes and pesticides, and in spite of every readable sign pointing to the absolute necessity for recycling and reuse, we continue to squander our bank account of water capital. Science has given us knowledge; who will teach us wisdom?

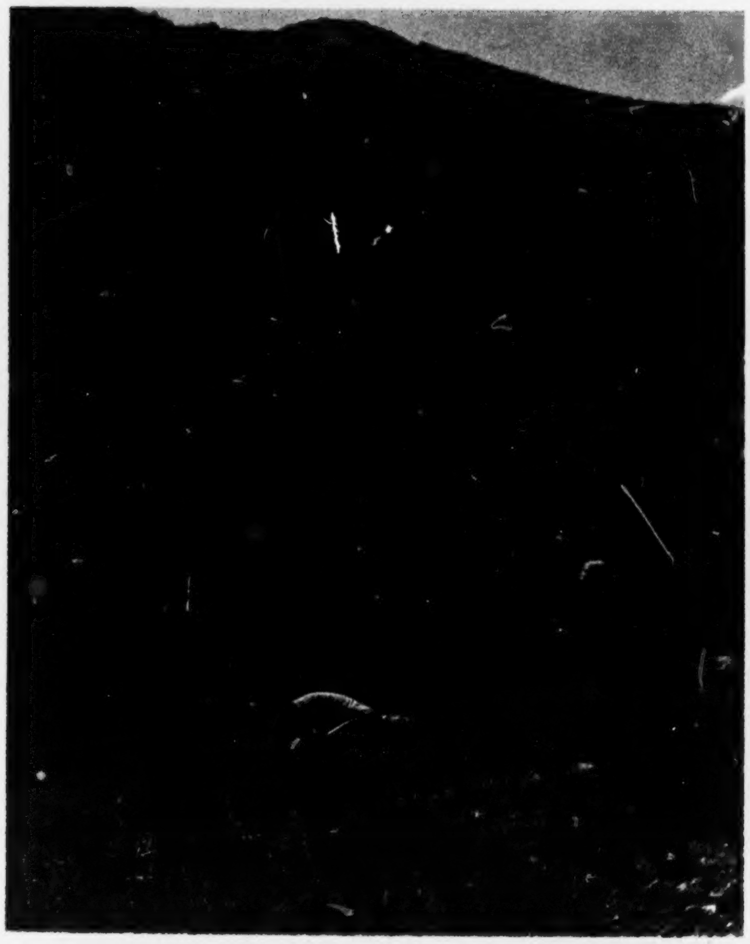
The heavy accent on water as an indispensable resource is reflected in the emphasis placed by the Department on its conservation and utilization. No other resource commands a comparable percentage of Departmental time, funds, and talent.

Water is the primary concern of the Bureau of Reclamation, the Geological Survey, and the Office of Saline Water. It is a secondary concern of the Southeastern and Southwestern Power Administrations, the Bonneville Power Administration, the Bureau of Mines and the Fish and Wildlife Service.

The water responsibilities of Interior include mapping it, studying its properties, predicting its behavior, impounding it, diverting it, desalting it, delivering it and using it to create electricity, fish and wildlife habitat, and recreation areas.

The United States is entering a period when water manage-

Photo by Jim Lee



(Above) The stupendous flow of the Amazon, the mightiest of the world's rivers, is measured by Geological Survey hydrologists.

(Left) Water is for fun but to be fun the water must be pure. In clean lakes and streams recreation can be a quality experience.

ment is becoming a major concern. As urban areas expand, pollution assumes intolerable proportions without constant and sometimes radical updating of waste disposal processes. In many parts of the West great emphasis is being placed on reduction of seepage and evaporation losses, on canal lining, improved irrigation and drainage practices and other water salvage and management challenges.

Unfortunately, the know-how we already possess is frequently not applied to these water problems until some drastic event—flood, withering drought, or stunning fish kill—focuses attention or rouses public opinion. By that time, the solutions may be much more difficult or costly to achieve. Cities, farms and industrial centers may have grown up on flood plains or invaded logical canal, dam and reservoir sites. Often, preventive or remedial works in these areas merely results in attracting more of the wrong kind of development by creating a false sense of safety.

When salt or foam is noted in well water, showing that the ground water is contaminated, it is often too late to do anything about it. Creative management seeks to avoid critical water problems rather than to repair damage after the harm —sometimes irreparable harm—is done.

A penny saved may be a penny earned, as the old saying has it. But a gallon of water saved is considerably more than 4 quarts of water earned. It represents not only the crops grown, the recreation afforded, the thirst assuaged or the electricity generated by a gallon of water; it represents, too, the tremendous effort and expense involved in harnessing and delivering this water—the building of a dam, of a powerplant or a complicated distribution system, needed for full development of our water resources.

Thus, it is logical that water-salvage programs are given high priority in today's Reclamation effort. Work to deepen and straighten channels, clearing out of sediment, evaporation control and destruction of water-wasting plants are all part of Reclamation's salvage work. It has been estimated that four such projects currently underway ultimately will save 500,000 acre-feet of water each year.

Geological Survey measures stream flows at 13,000 sites, monitors ground water conditions at 3,500 observation wells, samples water quality at 1,500 sites, and publishes the data promptly for use by engineers, planners, scientists and industry.

Flood studies of the entire 48-State land mass by the Survey will be completed in 1965, providing vital information in planning lengths and elevations of bridges, locating structures on flood plains and designing reservoirs and dams.

Some of the Geological Survey study findings have surprising implications. How many people, for instance, would list "cities" as contributive to floods? Probably not a handful. Yet a study of the effect of urbanization on floods in northern Virginia has shown that the mounting number of waterproof roofs and pavements has increased flood frequency, flood peaks, and total volume of flood waters.

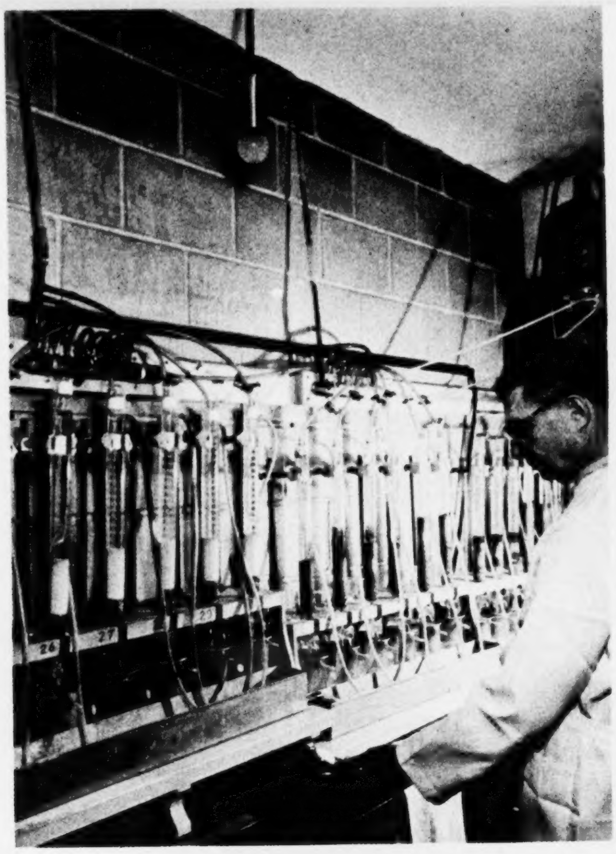
The Survey's water studies have tagged cities with still another black mark—that of choking the streams with sediment. Storm runoff from certain urban areas have been shown to contain up to six times the sediment concentration of corresponding runoff from rural areas.

The Bureau of Reclamation is engaged in developing our precious water resources in the 17 Western States. Reclamation's function is not just to conserve the water of the arid and semiarid West, but to put each drop to work in as many ways as possible.

By the end of fiscal 1965, the 4-year record of the Bureau in supplying irrigation, municipal, and industrial water and hydroelectric power to the West will be 47 percent above the accomplishment level of the preceding 4 years.

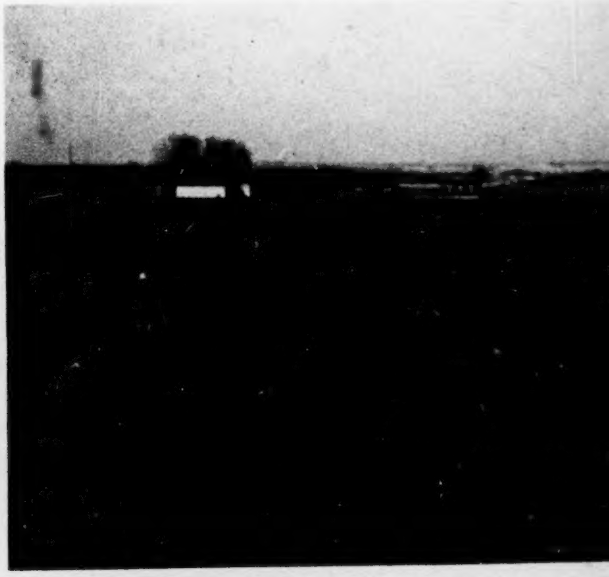
Over a billion dollars for water resources development has been appropriated or recommended in Presidential budgets since the accelerated program went into effect in 1961—an increase of 29 percent over the preceding 4 fiscal years.

Reclamation plant additions include dams, powerplants,



In this laboratory, Bureau of Mines scientists have developed a method for treating clays to prevent leakage in irrigation canals.

(Below) One way we keep the U.S. water picture in focus is by measuring streams. Here a high water mark is checked.



Water is for food too. The irrigation so vital to crops is carried by canal to this Montana farm.

transmission lines, irrigation systems, municipal and industrial water facilities, flood control works, fish and wildlife and recreation facilities. Evidence of this investment can be seen in fields green with high-vitamin vegetables, sugar beets, alfalfa and feed grains, fruit orchards, specialty foods such as grapes and dates, irrigated pasturelands, thriving industrial plants and prosperous communities, as well as beautiful lakes and playgrounds.

Since 1961, funds have been made available for 17 new Reclamation project starts. More than a million acres of arid land will be watered and municipal and industrial supplies will be increased by about 100 billion gallons. More than two-thirds of a million kilowatts of hydroelectric power, added flood protection, recreation and fish and wildlife improvement—also will show up on the plus side of the Reclamation ledger. The initial investment involved is more than twice that of the preceding 4 years—the payoff for the Nation's economy is incalculable.

Keeping ahead of the needs of a Western population expected to double by 2000 A.D. is no small job. Reclamation has increased its project planning activities by 60 percent over the preceding 4 years. Six new construction starts, in Idaho, Washington, Oregon and California, are provided for in appropriations for fiscal 1965.

Construction has progressed rapidly on the comprehensive Colorado River Storage Project (CRSP), so vital to the five-State Upper Basin, whose future rests squarely on the regulation and use of this once-erratic river.

Since 1961, three of the four storage features have been completed: Navajo Dam on the San Juan River in New Mexico, Flaming Gorge Dam on the Green River in Utah, and Glen Canyon Dam on the mainstem in Arizona.

On September 13, 1963, the final bucket of almost 5 million cubic yards of concrete was poured on the crest of Glen Canyon Dam, signaling an era of promise and progress for an area described by a surveyor a scant century ago as "valueless."

Along with the beautiful bridge spanning the canyon and the powerplant on the canyon floor, Glen Canyon Dam received the American Society of Civil Engineers' Outstanding Engineering Achievement Award for 1964, as the project that "demonstrates the greatest engineering skills and represents the greatest contribution to civil engineering and mankind."

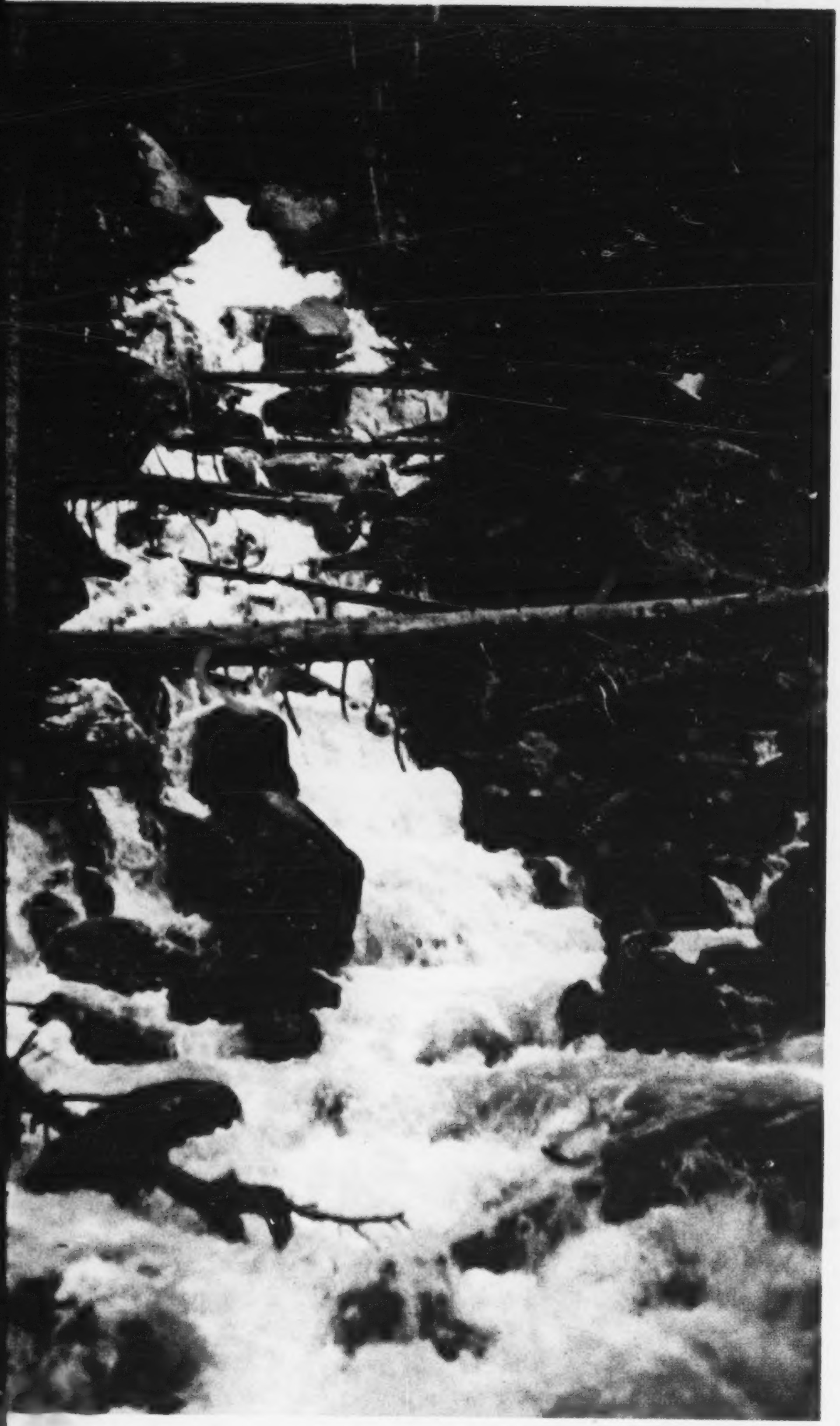
First CRSP power went on the line from Flaming Gorge in the fall of 1963 and power from the Glen Canyon plant—major producer for the system—was scheduled for the autumn of 1964. Power from the fourth unit, Curecanti, will flow into the system in the summer of 1966, target date for generation at Blue Mesa's powerplant on the Gunnison River in western Colorado. Morrow Point Dam, now under construction, should be furnishing hydroelectricity by 1967 and power from the Crystal plant will be available in 1969. Ultimate capacity of CRSP powerplants will be 1,200,000 kilowatts.

A Reclamation "first" in 1964 was the start on a structure at Montrose, Colorado, to function as the nerve center for operation, maintenance and control of the entire CRSP power system. Eight powerplants, scattered over a 110,000 square mile area of the Upper Basin, 2,500 miles of high voltage transmission lines and 2 million kilowatts of electricity, are involved.

A key participating project in the CRSP, the San Juan-Chama, was started in the spring of 1964. The first of three transmountain tunnels, this 13-mile project will pierce the Continental Divide at an elevation of 7,600 feet, to carry waters from the San Juan's upper tributaries in southern Colorado to the tributaries of the Rio Chama in north-central New Mexico. Eventually, three tunnels totaling 26 miles, will divert water into the Rio Grande Basin for critically needed irrigation, municipal, and industrial uses.

Another transmountain diversion—the largest ever undertaken in the West, is the Fryingpan-Arkansas Project in Colorado. Authorized in 1960 after years of effort by area residents and their Washington representatives, the project will bring

Photo by Robert N. Taylor



Our water supply begins with roaring freshets like this, trickling out of snowy slopes and swelling into torrents that wring out the watersheds to feed our great rivers.

desperately needed water from the Roaring Fork River on the western slope of the Rockies to the Arkansas River Basin on the dry eastern slope.

The diverted water will supplement an insufficient irrigation supply for 280,600 acres in the Arkansas Valley, serve several Colorado municipalities, and energize seven powerplants as it descends the eastern slope from a 10,000-foot elevation to the plains some 5,000 feet below. The project also has flood control, sediment retention, fish and wildlife, and recreation.

Work also began on the Glen Elder unit of the Missouri River Basin Project in north-central Kansas and construction of the Yellowtail powerplant and dam on the Bighorn River in Montana passed the half-way mark.

Placed under contract in 1964 were the eight motor generators for the pumping-generating plant at San Luis Unit of the Central Valley Project in California—a complex where Federal and State governments are coordinating their resources and responsibilities. These dual purpose units, largest ever ordered by Reclamation, will be capable of pumping more water than is used by Greater Los Angeles and New York City combined.

The San Luis unit will store water for irrigation of project lands in San Joaquin Valley and Southern California coastal cities and industrial water supplies, in addition to generating nearly half a million kilowatts of electricity.

In response to the growing municipal and industrial needs of the water-short West, the Bureau of Reclamation in fiscal 1964 provided nearly half a trillion gallons—enough for a population of around 11 million.

Rejecting piecemeal planning as inadequate and eventually wasteful, the Bureau of Reclamation has focused its efforts on river basin and regional planning. The Pacific Southwest Water Plan, announced this past year by the Secretary of the Interior after extensive consultation with Federal, State and local authorities, exemplifies interbasin planning to serve a large geographic region.

Designed to meet the most acute water crisis in the country, it calls for intensive development of water resources for the five-State area that is both the fastest-growing and the driest section of the United States.

The plan is based on establishment of a Pacific Development Fund, supported by lower Colorado River power revenues. These would help finance projects to meet the region's water needs and guarantee the availability of 7.5 million acre-feet of water each year in the Colorado River for use in California, Arizona and Nevada.

Construction proposed in the initial plan would cost an estimated $1.7 billion and would pay its own way in the pattern of all Reclamation projects, with only certain costs such as recreation developments, fish and wildlife conservation measures, flood control and area redevelopment to be borne by the United States as a matter of public policy. Other expenditures would be repaid within 50 years after each project became revenue-producing.

Early implementation of the plan has been urged by the Secretary to forestall economic stagnation with serious consequences not only to the Southwest but ultimately to the Nation as a whole.

Since 1909, the Geological Survey has been inventorying waterpower and reservoir sites on the public domain. Those which deserve protection are recommended to the Secretary of the Interior and they are withheld from disposal or conflicting use, ensuring their availability when needed.

The use of water for hydroelectric power in this country far exceeds any other use of that resource. About 2,000 billion gallons of water per day flowed through turbines to generate power in 1960 and at that time hydroelectricity output was increasing at the rate of 6 percent a year. Power generation is a water use which leaves every harnessed drop free to perform other tasks for man.

The Survey's streamflow records, basis of design for hydroelectric powerplants, are used to compute the power available at a damsite, seasonal and annual variations in flow, size of reservoir needed in order to even out these variations, and size of spillway necessary to handle floods safely. These streamflow records continue to be vital even after the powerplant is in operation.

Water and power work hand in hand to fashion a better life for our people.

The Federal government produces and markets about 12 percent of the Nation's power. Other public agencies produce about 8 percent. The private utilities, with about 80 percent, are the major producers.

The multiple role of the Federal government in the power industry is to supply power to rural co-ops and other public bodies at rates that provide a yardstick for measuring private power costs, to guard against monopoly, to conduct research and to promote efficiency.

Except for power sold by the Tennessee Valley Authority, all Federal power is marketed by the Interior Department. Interior has four power marketing agencies—the Bureau of Reclamation, Bonneville Power Administration, and Southeastern and Southwestern Power Administrations.

It is their job to build the transmission lines and sell the power produced at Federal dams built by the Bureau of Reclamation and the Corps of Engineers. It is their responsibility, from power revenues, to repay the Treasury, with interest, for the Federal investment in power resources.

Power revenues of both the Bureau and Bonneville have passed the billion dollar mark. All Federal power projects are on schedule or ahead of schedule in their repayment.

Power is also the paying power for irrigation. A substantial portion of project costs assigned to irrigation but found to be beyond the ability of the water users to repay is charged to power revenues.

New technology is helping Interior's power marketing agencies do a better, more efficient job. Technical breakthroughs in extra-high voltage transmission and bigger generating units, coupled with research into generation of electricity with exotic fuels, are projecting us into an era of unparalleled power development.

Traditional patterns of operation are being broken throughout the world. This quiet revolution is resulting in more and more integrated operations which are rapidly bringing our power resources to the most efficient and economical point in history.

The most significant development in extra-high voltage transmission in America came in August, 1964, when Congress approved Interior's plan for a Pacific Northwest-Pacific Southwest Intertie linking major Federal, public and private electrical systems in 11 Western States.

The intertie would consist of four major lines—two to carry direct current—from the Columbia River Federal powerplants to load centers in California and Arizona. Three interconnecting shorter lines together with use of existing transmission systems in the Western States will complete the job of tieing together systems of all 11 States. The lines are being built by a combination of the Federal government, the City of Los Angeles, and the private utilities of the Southwest, at a total coast of $700 million.

The sharing of costs and resources is dramatic evidence of the ability of public, private and Federal power to work together to assure abundant supplies of low-cost power. The multiplicity of ownership and operation also provides built-in protection against monopolies by any participant. Finally, the intertie proposal is engineeringly sound, economically advantageous, and consistent with the American pattern of diverse ownership of electric power facilities.

The intertie will be used to sell surplus Northwest secondary power in the Southwest and to exchange power between the two regions at "off peak," enabling generators which have been idle part of the time in each region to help the other region meet peak power demands. Benefits are estimated at $2.6 billion over the 50-year pay-out period for the lines.

The intertie plan grew out of a special task force study group initiated by the Secretary on March 10, 1961, with the Bonneville Power Administrator as chairman. The report recommended use of extra high-voltage 750,000-volt direct-current and 500,000-volt alternating-current lines for the intertie.

Congress also passed, and the President signed on September 1, 1964, the so-called Bonneville Marketing Area Bill. This legislation defines the basic marketing area of BPA as roughly the Columbia Basin and declares that only surplus power produced at Federal dams in the Northwest shall be exported from the region over the intertie, with reciprocal rights to other regions.

Next to the intertie, the most significant power development in 1964 was conclusion of the Treaty with Canada for joint development of the Columbia River. Under the Treaty, Canada is building three large storage dams on the Columbia on her side of the border, and the United States will be permitted to build Libby Dam, already authorized, which backs water 42 miles across the border into Canada.

The three Canadian storage dams will level out the flow of the Columbia and will increase capacity of existing U. S. dams on the Columbia by an additional 2.8 million kilowatts of power. Libby will add 700,000 kw at site and downstream. The four Treaty dams, including Libby, will end the threat of serious flooding on both the Columbia and Kootenai rivers.

Under terms of the Treaty, Canada receives credit for half the extra kilowatts of capacity at U.S. dams—1.4 million. However, Canada decided to sell her share of Treaty power in the United States for the first 30 years after each dam becomes operational for $254 million payable in advance. Columbia Storage Project Exchange (CSPE), a nonprofit corporation formed by representatives of public and private utilities in the Northwest, issued a $314 million bond issue—fourth largest

Photo by U.S. Department of Agriculture

revenue bond issue in the history of the Nation—to finance the purchase, including interest and other costs. CSPE is reselling this power to various Northwest public and private utilities which, in turn, are exchanging their rights to Canadian Treaty power with BPA for fixed amounts of power over a scheduled period of time.

The Treaty—16 years in the making—was signed by the President and the Prime Minister of Canada in January, 1961. It was ratified by the U.S. Senate in March, 1961, and by the Canadian Parliament in June, 1964. President Johnson and Prime Minister Pearson met under the Peace Arch on the Canadian-American border at Blaine, Washington, on September 16, 1964, in a ceremony recognizing completion of Treaty negotiations.

Within the next decade the Bonneville Power Administration grid will become the hub for a vast transmission network of public and private lines stretching from the Peace River in British Columbia to the Mexican border.

Completion of the Treaty dams, including Libby, addition of new generators at existing U.S. Columbia River dams, the Hanford atomic steamplant, and construction of major interties between Canada, the Northwest and the Southwest will expand the horizons of power conservation.

These developments will intermesh power resources of a land area covering nearly one-third of the North American continent and six major river basins. Existing systems thus tied together would form a power pool of 45,000,000 kilowatts, more than half of which would be produced by hydroelectric projects.

Historically, it will be the first time anywhere that all electric resources, hydraulic, atomic and fuel-fired, have been electrically integrated on such a large scale.

Engineers and economists are hesitant even to try to estimate the benefits of such a complex and far-flung operation. Initial studies show a bonus of millions of additional kilowatts in in firm-power capacity. Even estimates are not yet available in terms of the conservation of basic natural resources such as water, land and fossil fuels.

A new age of cooperation and teamwork among public, private and Federal utility interests is dawning. The new era is necessary if we are to meet the staggering power needs of future generations—power needs which double every 10 years.

The benefits to the customers which result from coordinated

Clean water is man's most versatile servant— It spins turbines, creates beauty, slakes thirst

Photo by Herrin F. Culver—US

operations are enjoyed in all Interior marketing areas.

In the Southeastern Power Administration area, several groups of hydroelectric plants now are operated on an integrated basis. One group, consisting of Clark Hill, Hartwell, Buford, Allatoona, Walter F. George and Jim Woodruff plants, has a dependable capacity at all times of 870,000 kw when operated on an integrated basis. Operated as isolated plants, the sum of the individual capacities would be only 721,000 kw. Another group of six integrated plants in the Cumberland Basin, most of the output of which is sold by Southeastern to the Tennessee Valley Authority, has a dependable capacity of 600,000 kw, compared with only 400,000 kw if operated independently.

Part of the job of the Interior power marketing agencies is to plan ahead for future power needs of the regions they serve.

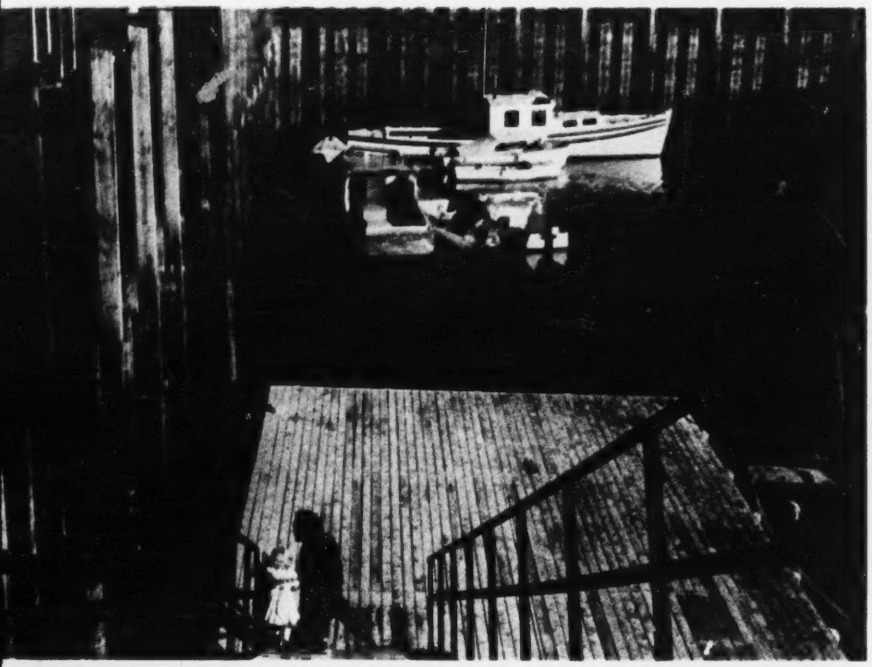
In the Northwest, with 6.6 million kilowatts of Federal capacity already installed, another 2.5 million kilowatts is under construction and an additional 3.5 million kilowatts authorized and scheduled for completion by 1975.

In the Southwestern Power Administration area, 10 multipurpose projects existing have a total installed capacity of 977,000 kilowatts. Nine more hydro plants with an installed capacity of 777,500 kilowatts are under construction with 20 more sites yet to be developed.

The development of pumped storage hydroelectric power acts as a storage battery in which quantities of electrical energy are stored during nighttime off-peak hours. Water is pumped to hilltop reservoirs, then allowed to flow through hydroelectric generating plants at lower levels during peak load hours. Many sites for this type of development exist in the Southwestern area and thousands of kilowatts may be utilized in this way in the future.

As power systems grow in complexity, automatic controls will take over. The heart of this control system will be a high-speed digital computer. As large systems interconnect, control systems must be coordinated. A communications satellite could well be the key to maximum efficiency of the intricate communication networks that will be needed.

For centuries man has pondered the tides as a source of power, but the proposed Passamaquoddy International Tidal Power Project is a dream that has had substance only since 1919. In that year, Dexter Cooper, an engineer, stood on the shores of the bay which separates the United States from



The tremendous rise and fall of the tides at Eastport, Maine, made this floating dock a necessity. At left, a mother and her child carefully work their way down the ladder side of the steeply tilted ramp. Six hours later, at high tide, the same ramp affords easy access to the high-floating dock. The power potential of this rhythmic rise and fall is enormous.

Canada and vowed he would build there the first tidal plant to generate electricity.

Later, in 1935, Franklin D. Roosevelt caught the vision and allocated $7 million to the Army Corps of Engineers to start construction.

Both Cooper and Roosevelt were ahead of the times.

An unrelated series of investigations kept the proposal hanging fire for another quarter of a century, until finally, in July 1963, a six-man committee appointed by the Secretary of the Interior, found the project feasible.

The tide had turned for Passamaquoddy.

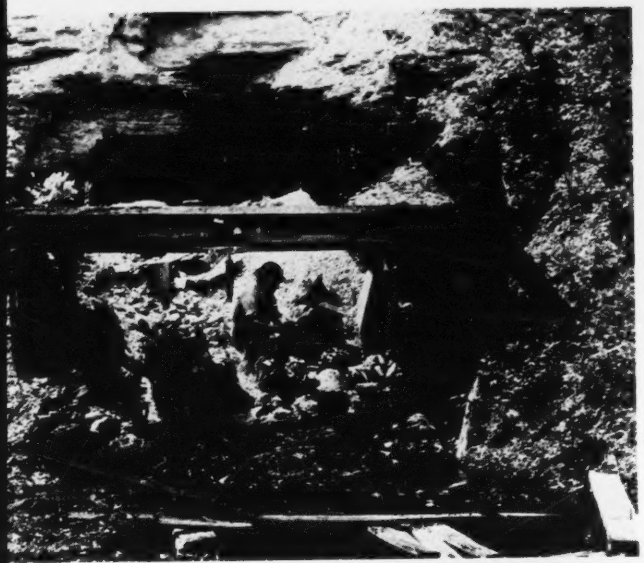
Technological advances and mounting power demands combined to make the tidal power plant and the associated Upper Saint John River development not only engineeringly sound but economically attractive.

The promise of the Passamaquoddy-Saint John development is much greater than that envisaged by Cooper or Roosevelt. Today it includes not just relatively low-cost power, but flood control, recreation, new jobs, improved navigation and the insured orderly development of these related resources to the benefit of both the United States and Canada.

The Secretary of the Interior has strongly recommended authorizing legislation and testified vigorously on behalf of Passamaquoddy before Congressional committees in the summer of 1964. Any decision to build this project involves also the approval and participation of the Canadian government and the government of the Province of New Brunswick.

University research into new and improved ways of conserving water and of dealing with water problems received major assistance with the enactment of the Water Resources Research Act, which President Johnson signed July 17, 1964. The Office of Water Resources Research, established in the Department that same day, will administer grants-in-aid to support one water resources research center in each State, aid specific water resources research at the land-grant universities, and assist water projects at other universities or research institutions.

To meet the goals recommended by the Senate Select Committee on Water Resources—comprehensive plans for all major river basins in the Nation by 1970—the ad hoc Water Resources Council had 19 studies underway and 15 in the works. Fiscal policies were under review and budgets of the



The abandoned mine at left is one of many such sources of acid drainage. Red means danger and the crimson current in the stream at lower right is a warning to fish, vegetation and wildlife. It even threatens human health.

four participating agencies—Interior, Agriculture, Army and Health, Education and Welfare were coordinated for each river basin. The four Departments also adopted policies governing standards for evaluating primary outdoor recreation benefits.

Three Interior agencies joined forces in 1964 with the Public Health Service and several States in an effort to control the acid drainage which results when water flows over exposed coal surfaces. In strong enough concentrations, such drainage can kill fish, destroy vegetation, even endanger community water supplies.

This specific water pollution problem is hindering full development in at least seven eastern States, most of them already economically depressed. The scientific and engineering talents of the Bureau of Mines, Bureau of Sport Fisheries and Wildlife and Geological Survey have been pooled and launched on a 3-year study and testing program. Control methods to be tested include mine sealing, diversion of surface waters flowing into mines and of acid drainage issuing from them, and construction of small reservoirs where acid water can be impounded and neutralized before being allowed to enter streams.

People continue to multiply, but the amount of fresh water available from natural sources remains almost constant. As more and more people "come to the well," man finds he can no longer wait for the clouds to deliver fresh water. He is being pushed to the seas as his growing thirst hastens the day when he must augment the rain cycle.

The importance and impact of the Department of Interior's Saline Water Program were brought home to the Nation on February 26, 1964, when headlines around the world proclaimed that an experimental sea water conversion plant would be transported from its site near San Diego, California, to the U.S. Naval Base at Guantanamo, Cuba.

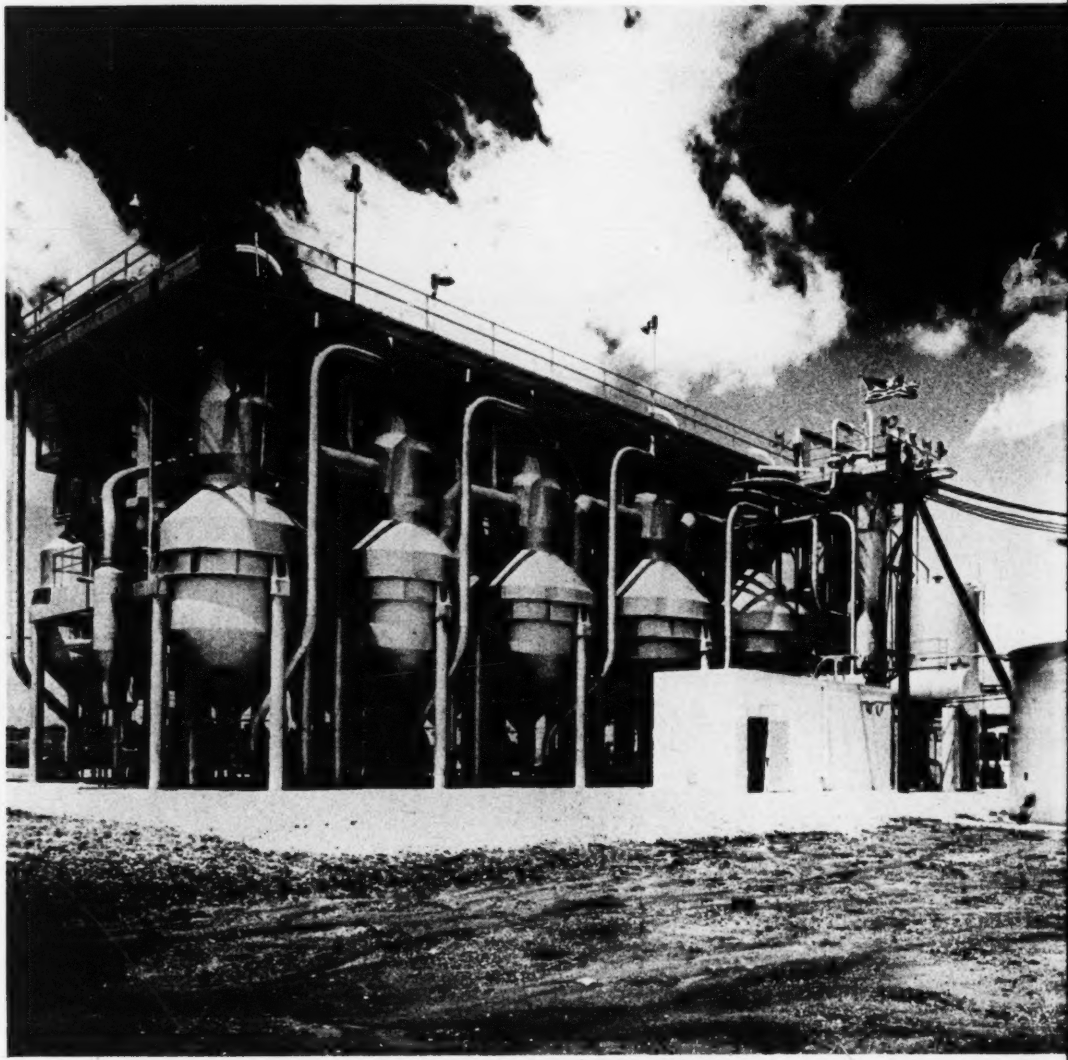
Transfer of the plant from the Department of Interior's Office of Saline Water (OSW) to the Department of the Navy took place as part of the government's program to make that vitally important base self-sufficient after its regular fresh water supply was cut off by Cuban Premier Fidel Castro. Interior offered the plant, the Navy accepted, and exactly 5 months later it began operating on the Naval Base in Cuba.

It rains and rains into the sea—And still the sea is salt

Old English Nursery Rhyme

Photo by Ken Cobean

Vapor compression distillation plant—world's largest, at Roswell, N. Mex.



At Freeport, Tex., the multiple-effect LTV (long-tube vertical) process converts 1 million gallons daily.

The San Diego sea water conversion plant, considered one of the finest in the world, was producing 1.4 million gallons daily at the time it was dismantled. In 2 years of operation it had produced more than half a billion gallons of fresh water.

Shortly after going into production in March 1962, the plant reached its design capacity of 1 million gallons daily. Subsequent experiments with higher operating temperatures increased productivity to 1.4 million gallons daily with virtually no increase in capital investment and only a slight rise in operating costs. Fresh water was produced for between $1 and $1.25 per 1,000 gallons.

The San Diego plant is one of several being operated by the Office of Saline Water to demonstrate various processes of saline water conversion, and to continue the search for ways to improve processes and reduce costs. Other Office of Saline Water demonstration plants continued production at Freeport, Texas; Webster, South Dakota; and Roswell, New Mexico.

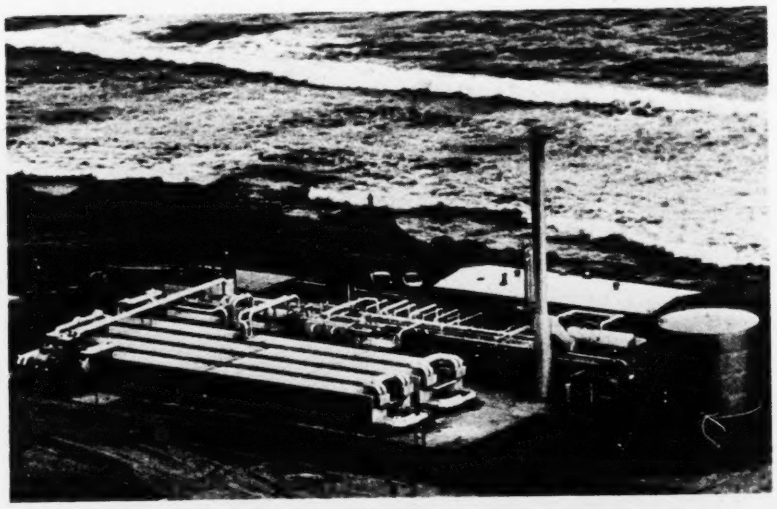
At Wrightsville Beach, North Carolina, a 200,000-gallons-per-day plant was virtually completed. At this same location the OSW has established a Research and Development Test Station—the only one in the world designed solely for operating and testing of saline water conversion pilot plants. The station provides standardized conditions which permit accurate comparisons of processes.

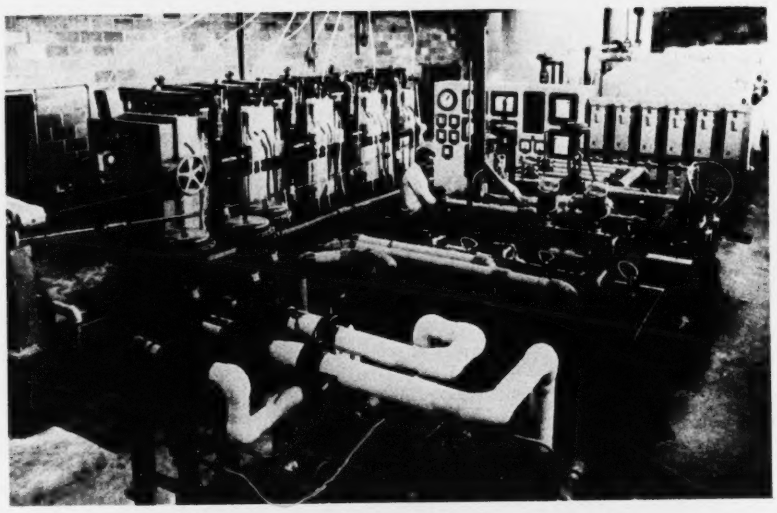
Since 1952 when the Office of Saline Water was established, the cost of producing fresh water from saline sources has dropped from between $4 and $5 per thousand gallons to present day cost of $1 to $1.25 per thousand. Costs are expected to continue a gradual decline as engineering and technological advances are made.

Faced with the problem of taking the salt out of water or taking water away from salt, scientists found water a good deal more complicated substance than they had realized. Today, armed with years of research, they are figuratively climbing inside the complicated little molecule and discovering strange and unpredictable reactions.

The freezing process for converting sea water to fresh is near readiness at Wrightsville Beach, N. C.

When Fidel Castro cut the water supply to Guantanamo, San Diego's multistage flash plant saved the day.





Webster, S. Dak., uses fresh water from this plant, which converts 250,000 gallons of brackish water daily.

One example of the payoff is the development of a synthetic osmotic membrane which rejects dissolved salts in solution and allows only fresh water to pass through. Under contract to the OSW, University of Florida scientists were able to find the chemical combination, but their early success was measured in drops.

Years of exacting study followed to develop an understanding of what took place inside the thin cellulose acetate membrane to cause this separation. Scientists finally were able to design new membranes with improved salt rejection and water flow properties. During the past year, the fresh water capacity of a square foot of membrane surface reached 20 gallons a day. The new process that resulted—known as reverse osmosis—moved toward economic practicality. At the same time, basic research continued to probe the membrane's molecular structure in an effort to improve its effectiveness.

The third international conference on peaceful uses of atomic energy opened in Geneva in September 1964 with an invitation from President Johnson for all members of the United Nations to join the United States in developing methods for desalting water. Earlier in 1964, the United States negotiated separate agreements with the Soviet Union, Mexico and Israel for cooperative efforts toward the same goal.

In addition to its research program, the Office of Saline Water cooperates with governments in water-poor areas of the world. Mexico and Saudi Arabia are two of the areas where specific studies have been undertaken. The continued efforts of the OSW are contributing significantly to making the oceans an economical source of fresh water.

Science can help enlarge existing supplies of water by perfecting the techniques of desalination, by teaching us to recharge underground reservoirs, by discovering effective evaporation control methods—perhaps even by unlocking the clouds in one region without depriving another of normal precipitation.

But better water management will become a reality only if enough enlightened citizens insist that pollution be controlled and that recycling, reuse and conservation of water be made a part of daily human husbandry.

Photo by Abbie Rowe

Happy is the family that can find outdoor recreation opportunities within comfortable commuting distance of home.

The Pause That Recreates

Recreation—The renewal of our inner resources

The new age of leisure—blessing or curse?

The answer will be found to a substantial degree in the way we handle our out-of-doors. Future increases in real income, shorter working hours and greater mobility are destined to test our recreation opportunities to the utmost. The National Park Service and the Bureau of Outdoor Recreation are preparing to meet that test.

One of the most recent additions to the constantly changing concept of conservation is the provision of outdoor recreation opportunities to meet the needs of all our people. No longer is this concept merely two-dimensional. A fine piece of land or water is still needed, but the quality of that water—the natural or historic heritage represented by that land—the purity of the air over it—all these things concern conservationists today.

There is a growing realization that man is not outside of nature, but a part of nature . . . . that nature is not a commodity we can exploit for gain, but an estate to which we belong. This new dimension of conservation includes the past as well as the present, the beautiful as well as the useful, social as well as economic values, urban neighborhoods as well as natural landscapes. It is a protest against ugliness, against the destruction of historic landmarks, against the pollution of water and air, against the blight of unplanned development with its bleak, cheerless, monotonous march across the countryside.

It recognizes the importance of beauty to all men. It is a growing awareness that the United States will not be judged by its power, but by the quality of its civilization.

It is within the context of this evolution of our conservation philosophy that one most clearly appreciates the roles and functions of the National Park Service and the Bureau of Outdoor Recreation.

Two signal legislative achievements by the 88th Congress marked the end of a long effort on the part of Interior in

Photo by Jack E. Boucher

(Right) This car sticker will permit annual admission to improved U.S. recreation areas.

Outdoor Recreation
'65
Land
& Water
Conservation
Fund
for America

support of the Wilderness Act and the Land and Water Conservation Fund Bill.

After years of almost-making-it, the Wilderness Act became law on September 3, 1964. It provides for a system of specifically designed wilderness areas in National Parks, Forests and Wildlife Refuges. The poetic language of the bill describes wilderness as "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain."

Those who seek to preserve a few precious vignettes of our wilderness heritage at last have been handed a potent legislative assist.

The Land and Water Conservation Fund Act of 1965, signed into law by President Johnson, also on September 3, 1964, will provide a means of financing outdoor recreation area planning, acquisition and development at State and local levels, plus some Federal acquisitions. The largely pay-as-you-go Fund will derive money from modest admission and user fees at certain designated Federal recreation areas, net proceeds from the sale of Federal surplus properties, existing Federal motorboat fuels tax, and advance appropriations averaging $60 million annually during an 8-year period beginning the third year after enactment.

Estimated annual receipts during the first 10 years will average about $180 million. About 60 percent of the Fund, whose life is limited to 25 years, will be available to the States on a matching 50–50 basis. The remaining 40 percent is earmarked for Federal purposes.

Need for the Fund arose from the fact that the United States is running out of free outdoors. No longer is it possible to carve parks and recreation areas where we most need them out of the public domain. The majority of the public, unfortunately, is not located anywhere near the majority of the domain. So, while the West contains 90 percent of the remaining public domain, 85 percent of the United States citizenry lives in the East and Middle West. The problem is one of finding and financing acquisition and development of areas to serve this heavily urban population.

Since 1872, when Yellowstone—the first national park in the world—was established, the National Park System has grown to include 31 National Parks, 4 National Seashores, and 170 assorted Monuments, Historic Sites and Recreation Areas, totaling in all about 26 million acres of land and water. This is no small ranch.

The "ranch" however, is too small and needs to be enlarged. The reason for the need is people. In 1917—the year the Service began functioning—the number of visitors to all areas was less than half a million. During the 1964 fiscal year, the

Photo by John M. Kauffman

Rotten logs to redwoods— Outdoor opportunity remains

number of visits exceeded 94 million. By 1966—the Golden Anniversary of the National Park Service—visitation is expected to reach nearly 110 million.

With a tidal wave of visitors looming in the future, the Park Service has undertaken a dynamic park planning program, designed to round out the National Park System. Under this program, outstanding scenic, scientific, historic and recreational areas are being studied and selected for consideration by Congress.

Although no new areas within the Park System were authorized in fiscal 1964, ending June 30, 1964, the 88th Congress authorized or established nine new areas before it adjourned in October. Included were such important additions as the 257,000-acre Canyonlands National Park in Southern Utah, a 4,300-acre National Seashore on Fire Island in New York, and the Ozark National Scenic Riverways in Missouri.

Perhaps the outstanding accomplishment in fiscal 1964 was acquisition of 56, 263 acres of land and waters valued at $13 million for inclusion in 42 existing units of the National Park System.

The added lands range from the subtropical Virgin Islands to the subarctic State of Alaska and vary from historically significant city parcels to an 8, 370-acre tract of scenic land containing important dinosaur fossils. Other tracts were along the seashore, in the deserts, among the mountains, in unspoiled forests, and on the prairies.

At the Point Reyes National Seashore, California—the first such national area on the Pacific Coast—nearly 11,000 acres were acquired. In addition, 18 options for the purchase of 9,035 acres have been negotiated, making more than one-third of the 53,000 acres within the authorized boundaries of Point Reyes either owned by or opted to the United States.

At Padre Island National Seashore, Texas—the first such park on the shores of the Gulf of Mexico—the State of Texas gave to the United States all its interests within the authorized boundaries, including 33,545 acres of submerged lands. Plans for land purchase program are underway. Land acquisition within Cape Cod National Seashore, Massachusetts—the second such area authorized on the Atlantic Coast—reached 1,420 acres. The aim here is to acquire land parcels large enough for workable administration.

Cape Hatteras National Seashore, North Carolina—the first such area in the United States—is now entirely in Federal ownership.

Recreational opportunities are the most obvious features of our National Park System and Americans are taking advantage of them in ever-increasing numbers. Almost every recognized

Photo by Jack E. Boucher

The rugged beaches and offshore islands of Olympic National Park in Washington are typical of our scenic treasure.

form of outdoor enjoyment can be found in one or more of the units which make up this unique network of parks. More than 1,600 roads and trails, utilities and other developed projects were begun in fiscal 1964.

Much of the construction was made possible by more than $11 million allocated under the Public Works Acceleration Act. Building of campsites, picnic areas, roads, forest protection and other long overdue facilities created thousands of jobs for the unemployed in economically distressed areas.

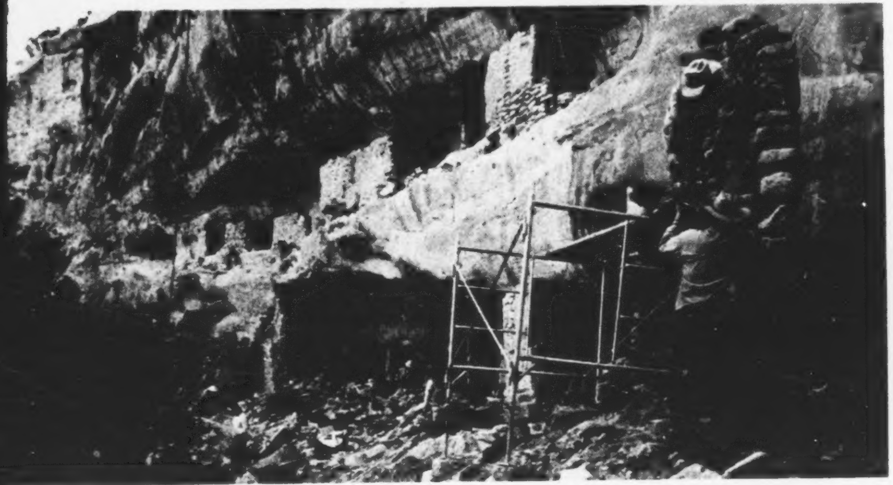
Throughout the System, development emphasis was on provision of new visitor recreation facilities. Almost 6,000 campsites were added in 26 States and more than 1,800 additional picnic sites were built in 16 States. Yet even this breakneck pace will not suffice. Park campers during fiscal 1964 exceeded 6 million—and an increase of 1 million is forecast for fiscal 1965.

"Travel to your parks by air" may become the slogan of vacationers when public airports for general service aircraft go into service in the vicinities of Yellowstone and Grand Canyon National Parks. The Park Service has long recog-

Cape Hatteras lighthouse signals a decade of pleasure for visitors to this country's first National Seashore.

Federal protection ranges from Cape Cod's shores to Florida Keys' underwater sea fans.

Jackson Lake (right) in Grand Teton National Park, offers outstanding outdoor recreation.



Sightseers' feet had threatened to dislodge this prehistoric Mesa Verde cliff dwelling. Here, it is stabilized.

Canyonlands National Park, the first to be created from public domain in 35 years, was approved in 1964.

nized the increasing popularity of air travel to the National Parks. For the many who prefer this means of travel, the new airports will cut down on travel time and lengthen the enjoyment of the parks. Both airports were endorsed by the Service and construction is being carried out by the Federal Aviation Agency and State aviation agencies concerned. They will start operating in 1965.

An airstrip for light planes was constructed in the Wright Brothers National Memorial, North Carolina, and dedicated on the 60th anniversary of the first flight, December 17, 1963.

Demand for similar facilities in or near other national parks, monuments and recreation areas was surveyed and a bill introduced in Congress to increase authorization for this kind of program.

The millions of visitors who flock to our National Parks are in danger of destroying the very nature of the thing they are seeking. In some places, such as Mesa Verde National Park, both preservation and use can be served by such measures as the recent concession contract, which provides new, relocated overnight accommodations, dining and merchandising facilities. These will reduce the present heavy visitor impact which has had serious effect on natural and archeological values.

The solution is not always so simple.

As stated in the highly publicized report of the Secretary's Committee on Wildlife Management, the national parks should represent vignettes of primitive America . . . a seemingly easy aspiration and yet, as the report emphasized, the implications are stupendous. Yet this is the goal toward which the Park Service must work if the unique features and qualities of the parks are to be preserved. To this end, the Service last rear reorganized its research effort under an Assistant Director for Resource Studies—bringing together for the first time the research being done in the fields of natural science, archeology, history and other specialized fields.

A study by the National Academy of Sciences—National Research Council, made specific recommendations, which will gear the Service to obtaining basic knowledge about natural and historic resources in the National Parks, so that the most effective management can be applied.

The obligation of the National Park Service to manage park resources is matched by its obligation to serve, protect, and provide facilities for the park visitor. Improvement of visitor services was one of the major aims of the 1964 reorganization. For the first time, all park visitor services are being coordinated by one unit. Likewise, all elements of the Service's interpretive program were brought together.

Visitor centers featuring exhibits, information desks and audiovisual devices are focal points of information, orientation, and interpretation for park visitors. During fiscal 1964 the Park Service installed nearly 300 new exhibits, built 11 new visitor centers and remodeled three.

Most valuable accession to the Park Service museum collection was a $50,000 full-scale replica of the Wright Brothers 1903 powered airplane, built and donated by the American Institute of Aeronautics and Astronautics, and installed at the Wright Brothers National Memorial visitor center in North Carolina.

In a continuing effort to save meaningful historic treasures, the Advisory Board on National Parks, Historic Sites, Buildings and Monuments conducted 29 studies. The 144 sites and buildings approved for the Registered National Historic Landmark Program brings to 548 the number eligible for status to date.

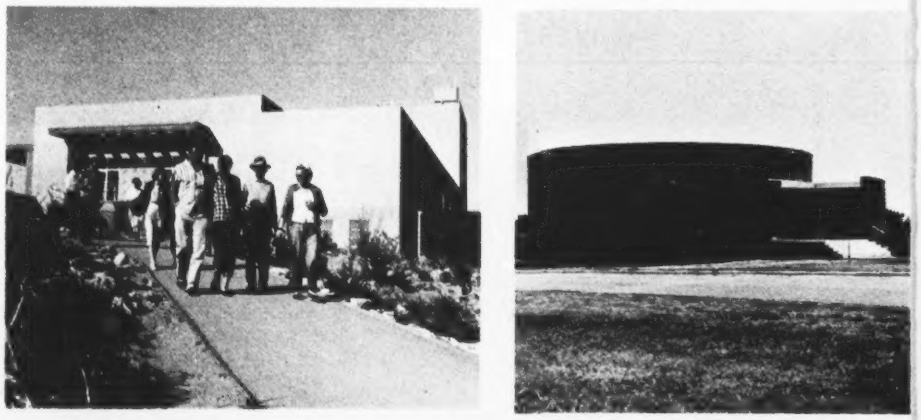
Historic values have found their champions in the Park Service, but Service concern has not stopped there. The Inter-Agency Archeological Salvage Program carried on intensive research in 44 States. Major excavation and preservation projects produced new information on our Nation's early history, its historic and prehistoric Indian and Hawaiian peoples.

Three areas where great Americans lived were established in 1964. Previously authorized by Congress, they are Theodore Roosevelt Birthplace National Historic Site and Theodore Roosevelt's Long Island home, both in New York, and Lincoln Boyhood National Memorial in Indiana. Also established was Fort Davis National Historic Site in Texas, to commemorate the stirring exploits of the Western Indian wars and the securing of the Western frontier for settlement.

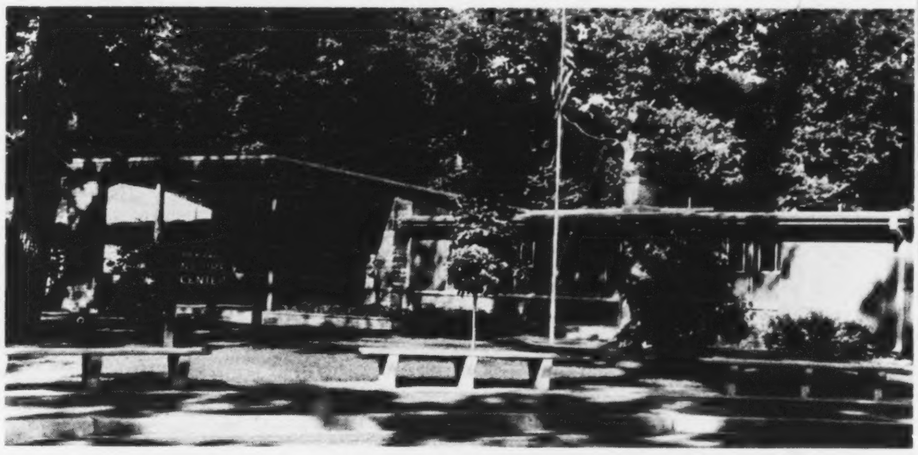
On March 17, 1964, a National Registry of Natural History

A meaningful introduction

Loft Mt. area in Virginia, opened in May 1964, adds 240 campsites and 52 picnic tables to our park system.



Visitor centers, such as these at Carlsbad Caverns (left) and Fort Pulaski, heighten enjoyment with interpretation.



This Nature Center in the Nation's Capital offers young and old an in-depth understanding of Rock Creek Park.

to Nature requires facilities and interpretation

Photo by M. Woodbridge Williams

Interior Secretary Stewart L. Udall leads a group of youngsters on a nature hike along the Chesapeake and Ohio Canal. Their trail is the towpath used by mules to draw barges through this historic District of Columbia waterway.

UNSAFE
FOR
SWIMMING

Landmarks coordinated and directed by the National Park Service was announced. Seven sites were designated for eligibility in the initial phase: Bergen-Byron Swamp and Mianus River Gorge, New York; Corkscrew Swamp Sanctuary, Florida; Rancho La Brea and Elder Creek, California; Fontenelle Forest, Nebraska; and Wissahickon Valley, Pennsylvania.

The Registry is designed to complement the National Historic Landmarks Program launched in 1960. Like its companion program, the new conservation venture in natural history will encourage preservation and protection of select sites—irrespective of land administration or ownership. Participation is entirely voluntary.

The National Parkways Construction Program, begun as part of the Mission 66 program 8 years ago, has completed nearly 265 miles of new public parkways. They continue to receive heavy use as each new stretch is completed. Last year 13 projects were completed at a cost of $10, 800, 000.

In meeting further the burgeoning demands of our mobile population, the National Park Service in collaboration with the Bureau of Public Roads studied several proposed national parkways: Allegheny Parkway, West Virginia, Kentucky, and Virginia; Cumberland Parkway, Tennessee–Kentucky, and Blue Ridge Extension into North Carolina and Georgia.

During fiscal 1964, the Department took a close look at our Nation's architectural heritage. Two conservation actions taken involved the work of the late Frank Lloyd Wright. The first was inclusion of the Robie House, Chicago, in the Registry of National Historic Landmarks. The second won an 11th-hour reprieve for the Pope House in Falls Church, Virginia, a modest suburban residence threatened by highway construction. Both houses are irreplaceable examples of architectural excellence.

Immigration and the westward movement soon will be enshrined in appropriate museums now under construction. The terraced base for Bartholdi's Statue of Liberty, part of the pedestal concept of Architect Richard Morris Hunt, will house an immigration exhibit, arranged by the American Museum of Immigration, a private, patriotic group. At St. Louis, the late Eero Saarinen's prize-winning design for a stainless steel parabolic arch is assuming form against the skyline. To be known as the Jefferson National Expansion Memorial, it will house a museum commemorating the westward movement of the pioneers.

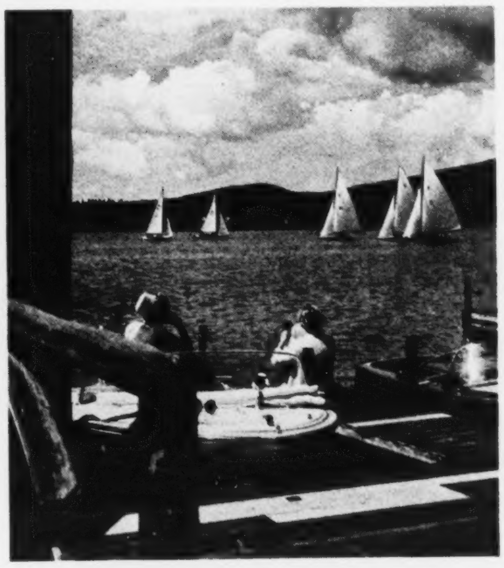
Time, circumstances and events have a way of altering uses. Land and water once supplied food, drink and means of transportation and that about summed it up. Today, recreation has joined navigation as a major use of inland waters. Fewer and fewer of our people farm the land but more and more are using it as a playground.

Outdoor recreation in America today involves a quarter of a billion acres of public and a vast amount of private land, has the participation of more than 90 percent of the population, supports a $20-billion-per-year industry, and accounts for local, State and Federal agencies' annual expenditures in excess of a billion dollars.

To provide a government focal point for the Nation's outdoor recreation activities, the Bureau of Outdoor Recreation was established in the spring of 1962. Located in the Department of the Interior, it has Government-wide responsibilities.

An Act of May 28, 1963, authorized the Secretary of the Interior and the Bureau of Outdoor Recreation to prepare and maintain a continuing inventory of recreation needs and resources of the United States, formulate a nationwide outdoor recreation plan, and encourage Federal, interstate, and regional

The lure of water is irresistible—even when that water is clearly unfit as a play place. Clean water thus is a stark national necessity



cooperation. The Bureau began developing the first nationwide plan in 1963.

Encompassing all forms of outdoor recreation—from small parks to multimillion-acre forest areas, the plan will cover every State in the Nation. Inventories will be taken of existing and potential recreation resources, with July 1, 1967 as target date for completion of the nationwide plan.

More than a score of Federal departments and agencies have varying degrees of responsibility in outdoor recreation, so close coordination is essential. Recreationists made a half-billion visits to Federal land and water areas in 1964; the number of yearly visits to Federal areas is expected to increase to 1 billion by 1976 and to rise even more steeply between then and the year 2000.

Recognizing the need to plan ahead, President Kennedy in 1962 established the Recreation Advisory Council—a Cabinet-level group whose function is to provide broad policy guidelines on matters affecting outdoor recreation resources and to help coordinate the work of the agencies concerned.

In 1963, the Council issued a statement setting forth criteria for selecting, establishing, and administering a relatively new category of Federal lands—National Recreation Areas. These areas will include lands possessing above-average endowments but of less significance than the unique scenic and historic elements of the National Park System. They may be managed by appropriate Federal agencies and could be jointly managed under Federal-State arrangements.

In March, 1964, the Council approved three policy statements emphasizing the urgency of preparing the nationwide outdoor recreation policy, of setting forth guidelines to advance water quality, and of recognizing scenic and recreational values in existing road programs.

The Secretary of the Interior in 1964 directed the Bureau of Outdoor Recreation to conduct a broad, overall review of Federal outdoor recreation resources, programs, and policies for guidance of the President, concerned Federal agencies, the Recreation Advisory Council, and Congress. Completion of this task may require several years.

In April 1964, the Bureau completed a study of federally controlled recreation lands at Allegheny Reservoir in western Pennsylvania. It recommended that these lands be administered by the U.S. Forest Service and that a master plan for associated lands in Pennsylvania and New York be prepared.

Allegheny Reservoir will inundate some 21,175 acres; the Secretary of the Interior endorsed the recommended plan as essential to orderly development of the reservoir area for public recreation.

Indispensable to the rapid development of our remaining park lands and other recreation areas is the National Topographic Map series, compiled by the Geological Survey's Topographic Division.

These maps reveal promising areas for development and provide bases for planning land acquisition, access, location of facilities and accommodations, and engineering studies and construction. The maps may also be used to determine best locations for recreational lakes, areas to be inundated, locations of beaches and boat launching facilities, routes for trails and bridle paths, sources of drinking water, campsites, and parking areas.

A large proportion of the 6 million Geological Survey topographic maps distributed this year were bought for use in connection with outdoor recreation. Through them, the outdoorsman can satisfy the urge to know "what's over the hill" and can find out how to get there.

During the year four new or revised editions of National

Park maps were prepared, eight were reprinted and three—Assateague Island in Maryland and Virginia; Pictured Rocks, Michigan; and Bad River Indian Reservation, Michigan—were added to the program in support of development plans of the Bureau of Outdoor Recreation.

To promote better understanding of the natural wonders of the National Parks and Wilderness Areas, the Geological Survey is publishing a series of leaflets on various aspects of earth science. The first leaflet, *Volcanoes*, already has appeared; others on water, rocks, glaciers, and geologic time, are forthcoming.

A major and growing public problem faced by the Bureau of Reclamation continues to be lack of recreation and related public-use facilities at its older projects.

A landmark in conservation legislation was set when Congress included authorization for fish and wildlife benefits and recreation in the Colorado River Storage Project. Since then, public facilities have been authorized at several new projects.

Despite inadequate accommodations, more than a million visitors a year had been going to Elephant-Butte and Caballo Reservoirs, two manmade lakes on the 59-year-old Rio Grande Project in southern New Mexico. In 1964, construction of public-use facilities began as a cooperative effort by Reclamation, the National Park Service, and the State of New Mexico. Operation and maintenance of the new facilities will be the responsibility of the New Mexico State Parks and Recreation Commission. The Bureau of Sport Fisheries and Wildlife and the respective States are establishing and maintaining sport fisheries in these waters.

Recreation facilities under construction on Reclamation projects promise to provide some of the Nation's most spectacular outdoor playgrounds. High on the list is the Glen Canyon National Recreation Area on the Colorado River Storage Project. When Lake Powell is filled, its waters will stretch 186 miles upstream from Glen Canyon Dam, where Reclamation's visitor center already is a popular feature.

Flaming Gorge, Navajo and Blue Mesa Reservoirs also are being developed as recreation areas within the Colorado Project. Excellent fishing, camping, swimming, boating and water skiing, in beautiful surroundings, add a valuable new dimension to this multipurpose project.

Another canyon renowned for its scenic marvels is the setting for the Yellowtail Unit of the Missouri River Basin Project in Montana. The Secretary of the Interior has proposed that land adjoining the 71-mile Yellowtail Reservoir be designated as the 63,000-acre Bighorn Canyon National Recreation Area. Its unique land features and rich Indian history qualify it as a national show place.

The Bureau of Reclamation, mindful of the fish and wildlife values inherent in its projects, cooperates with the Bureau of Sport Fisheries and Wildlife and State game and fish agencies to develop these assets. Field reports show waterfowl and other game thriving in increasing numbers on and around Reclamation projects, furnishing fishermen and hunters with heavy game bags.

In the attempt to provide outdoor opportunities for our increasingly urban population, the emphasis on recreation has been stepped up in many divisions of Interior which formerly had little or nothing to do with such activities.

Pacific Northwest trails offer some of the finest hiking in America. Olympic National Park contains the highest elevations in the entire coast range.

Photo by Jack E. Boucher

Photo by M. Woodbridge Williams

From Under the Earth

In this bank lies the exhaustible treasures

To most of us, "the world around us" is a semisphere, stretching out in all directions and coming to an arched peak somewhere in the clouds or the stars.

Weather is an absorbing topic of conversation and we are acutely conscious of our atmosphere. The other half of our sphere—the one lying under our feet—makes only a modest claim upon our attention. But were we suddenly to be deprived of all the taken-for-granted necessities and luxuries which depend upon mineral and fuel resources, the earth's crust might become an even hotter topic of discussion than the weather.

The Department of the Interior, as we have seen, is exploring the earth in a number of different ways, all of them concerned with wider knowledge and wiser use of our mineral and fuel resources.

The Geological Survey carries on a dual role in the area of minerals. Its scientists work to understand the geologic environment of mineral deposits, to learn how they are formed, and thus to make educated guesses as to where they may be expected to occur. They also prepare comprehensive reports for State agencies on the mineral and water recources of the State—where and how they occur.

Thus, Geological Survey is both a detective and an informer regarding the earth's resources. Now phosphate resources in North Carolina, California, Pennsylvania, and West Virginia were discovered last year by Survey geologists, as was an important clay deposit in Idaho. The Mojave Desert was found to have rich deposits of zeolites—minerals used in industry to soften water, remove moisture from gases and liquids, and aid in chemical production.

Mineral and water resource reports on Utah, Alaska, Colorado, South Dakota, Nevada and Idaho were completed and a report on New Mexico was in preparation.

The Survey also supervises development and production of minerals and fuels on Federal and Indian lands, to promote ever more efficient recovery, and conducts the mineral classifications upon which conservation and management practices are based. Constant reappraisal of the Nation's mineral estate protects it from inadvertent or unwise disposal, promotes wise development, and assures a fair revenue from holdings.

Early prospectors preceded the mappers into the mountains, but today mineral explorers go armed with the Survey's accurate topographic and geologic maps. Those early dis-

Calcium carbonate formations simulate a frozen waterfall on the high terraces of Yellowstone National Park.

The Nation's conservation picture was marred in the early days of the oil industry by such wasteful oil and gas production practices as the indiscriminate well spacing shown here.

Bureau of Mines' mineral conservation policies grow out of knowledge obtained by appraising sources of such metals as beryllium . . .

. . . by observing practices at large mines . .

coveries helped generate the demand for maps, which in turn have made easier the pinpointing of the increasingly important nonmetallic minerals.

Another dependable and prolific supplier of information on the Nation's mineral resource base is the Bureau of Mines. Armed with this basic resource knowledge, American industry made 1962 a record year in value and volume of mineral output. In 1963 the previous record was broken and 1964 gave every indication of establishing still another new high.

Evaluation studies by the Bureau combine the skills of the mining engineer, the metallurgist, and the mineral economist to provide industry and government with a better understanding of what the Nation has to work with.

Typical resource investigations have turned up reserves of nonmagnetic taconite—a source of iron for the future—in Minnesota; the space-age metal, beryllium, in Maine and Alaska; iron, beryllium and tellurium—a rare metal used in making strong, tough alloys—in Washington; and bauxite—for aluminum production—in Hawaii.

Yesterday's research should become today's practice, and such is the case in the mineral industry. Bureau research to raise efficiency and reduce waste in extracting and processing minerals and fuels has resulted in important savings for industry and slowed the drain on our resource base.

Examples of how this research has been put to work include:

An Alabama plant producing scrap mica for use in grinding applications, which recently doubled its output by adopting a Bureau method to recover mica formerly lost in processing; Idaho's phosphoric-acid industry, which has been shown how it can salvage marketable products from materials it now discards as waste; and Michigan's copper producers, who have significantly improved their milling and smelting practices with the aid of Bureau-devised techniques.

A giant step toward assuring continuing supplies of a limited and irreplaceable natural resource—one that was being needlessly wasted even as demands for it were skyrocketing—is the helium conservation program conducted by the Bureau of Mines.

In Congress it has been called an "ideal" conservation program, effectively combining efforts of government and industry in a vital investment for the future. Today, this program is saving helium at the rate of 275 million cubic feet each month. The program now underway promises to conserve enough of this versatile element to meet foreseeable needs

Stewardship replaces despoilment as men learn that our minerals are not an endless treasure

. . . as well as smaller ones . . .

. . . and by checking to make sure that abandoned wells like this one do not mark oil reserves which would be lost through flooding by a proposed reservoir.

well beyond the year 2000. Without the effort, adequate supplies might not have lasted past 1985.

Once known primarily as a safe, nonflammable lifting gas for blimps and dirigibles, helium suddenly acquired a host of new uses—shielding easily contaminated metals during arc welding, leak testing vital parts of missiles, rockets and components of such products as air conditioners and refrigerators, and in laboratory tests to control quality in hundreds of commercial items from wines to wonder drugs. The demand for helium has increased 11-fold since 1950.

Helium gives the "push" that ejects liquid fuels to the rocket engines thrusting our astronauts into orbit, and it promises an excellent medium for conducting heat from nuclear furnaces. In cryogenics, the fast-growing field of low-temperature research, liquid helium is indispensable. It is the only substance on Earth that enables scientists to approach, within a fraction of a degree, the absolute zero mark of −459.72° F.

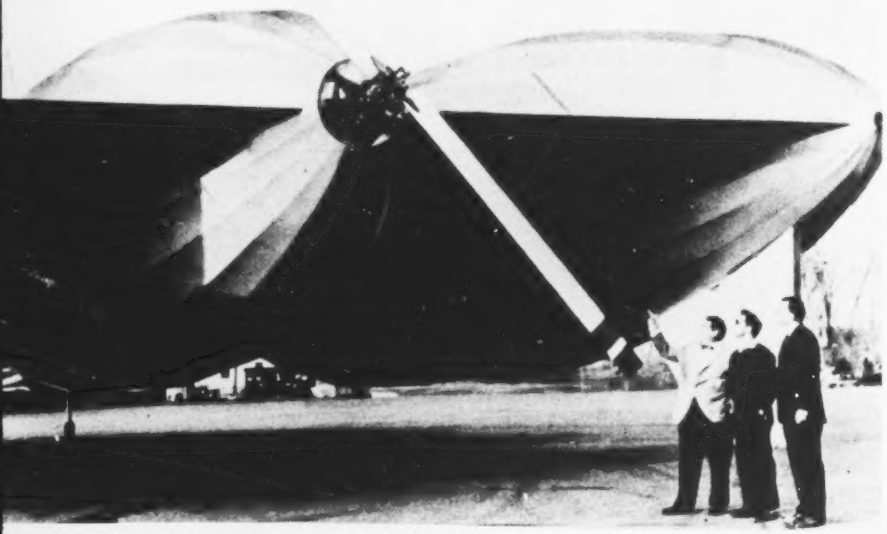
These, and many other uses, may well send the Nation's annual helium requirement from the present 690 million cubic feet to as high as 2 billion cubic feet by 2000 A.D. One thing seems certain: Helium will become even more important in the future.

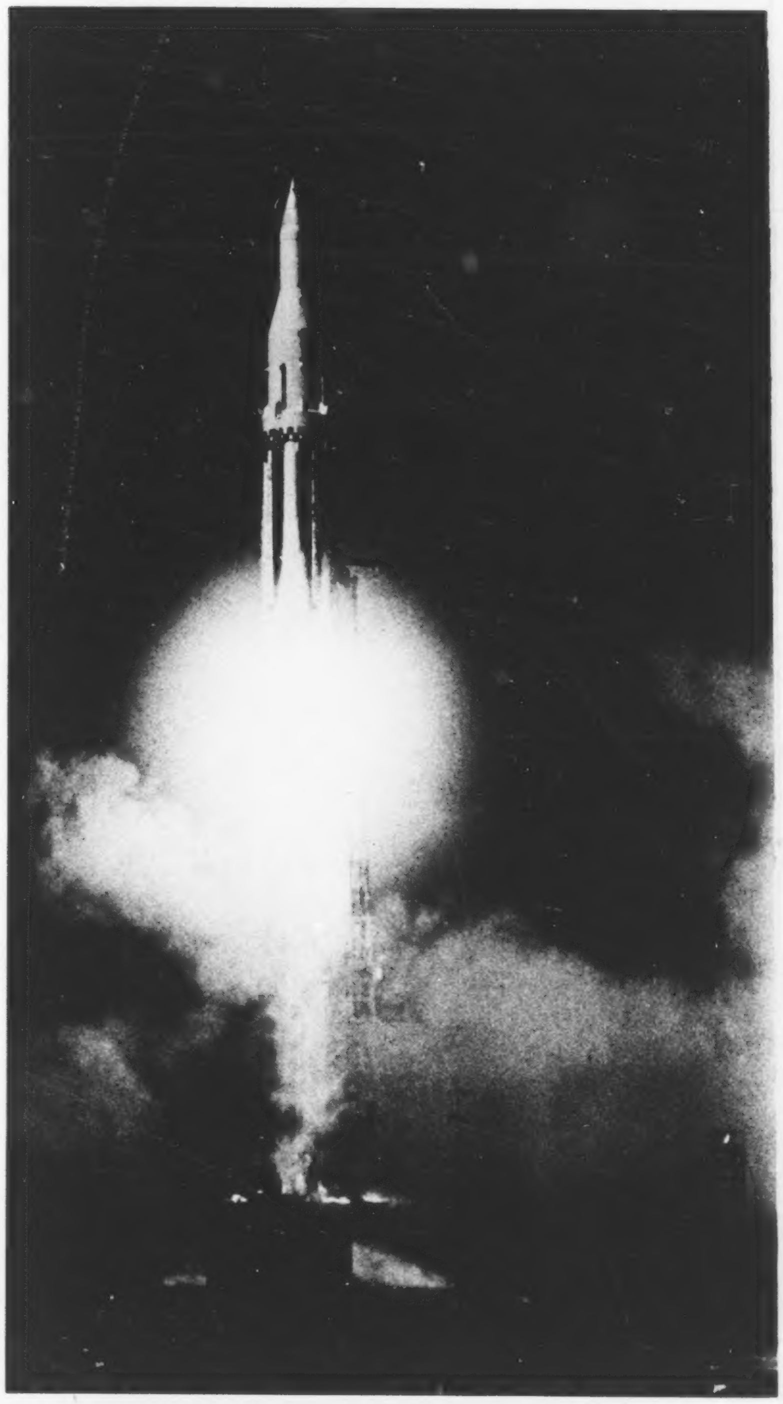
Over 95 percent of our known helium resource is in a few natural gasfields in the Southwest, all of which were discovered by private companies and are dedicated to supplying fuel-gas markets. As a minor constituent of natural gas, helium moves with it through transmission pipelines to gas consumers. When the gas is burned, helium passes to the atmosphere . . . wasted, without having served any of its useful purposes.

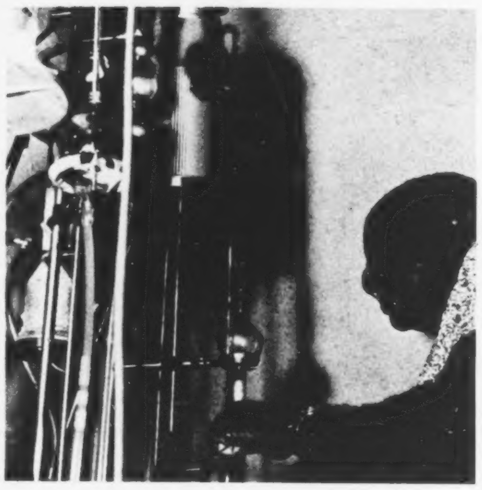
The plan for curbing this needless loss, developed by the Bureau of Mines, became the Helium Act Amendments of 1960. Funds for purchasing conservation helium from industry became available the following year, and negotiations began immediately. By November 1961 four long-term, helium-purchase contracts, utilizing all of the $47.5-million-a-year borrowing authority granted by the Congress, had been awarded. Under these contracts, private companies agreed to finance, design, build, and operate—as a risk venture—plants that would extract helium from natural gases destined for fuel markets and sell it to the Bureau of Mines for conservation.

Although the Bureau itself has for many years operated installations that recover helium from natural gas, plants of

Helium gives lift, the propeller forward motion to this unique aircraft. Air-scoops cool helium for descent.







(Left) Natural gas samples are analyzed by the Bureau of Mines in a continuing search for helium sources.

(Right) Space exploration and missile programs are reaping the benefits of long-term helium conservation.

the type and scale required for this program had never before been built. Yet, armed with basic knowledge supplied by the Bureau, industry achieved technological miracles. The 5 plants built under the conservation program are capable of processing, with a single helium-extraction unit, more than 10 times the quantity of helium-bearing gas handled by the 3 units at the Bureau's most modern installation.

All this was accomplished in remarkably short order. By July 1963, all five industry plants were operating, three in Kansas and two in Texas. They now are regularly delivering crude helium to a 425-mile government pipeline system, linking the industry installations with the Bureau's own and with the Cliffside field near Amarillo, Texas, where the rescued helium is being stored underground in a partly depleted natural gas reservoir for use when needed in the future.

By the time the four 22-year contracts now in force expire they will have made possible the purchase of approximately 62.5 billion cubic feet of helium that otherwise would have been lost forever. During the same period five plants operated by the Bureau of Mines are expected to produce some 15 billion cubic feet, making a total of more than 77 billion cubic feet of helium. Cumulative demand for the element has been estimated to total 36 billion cubic feet by 1983. So by that year, 41.5 billion cubic feet should still be in storage and available for use.

Helium today is enabling science to move in directions undreamed of 20 years ago. In many of its applications it is simply the *best* substance available; in some, such as low-temperature research, it is the *only* substance that will meet requirements. Helium's properties have made it virtually indispensable to our conquest of both the tiny atom and the vast universe. Now, it promises to help us tap the wealth of the oceans, by acting as a preventive to absorption of nitrogen into the human bloodstream and thus by making it possible for men to live and work under tons of water almost as comfortably as they do on dry land.

Without helium, such accomplishments might remain forever beyond our reach. The progress that has been made in conserving our limited resources of this remarkable element is, therefore, considered one of the Department's highest achievements.

The Department's Office of Minerals Exploration is re-

(Right top) Exploration drilling for uranium in Colorado requires a pair of trucks—one to mount the drill rig and one to carry the compressor.

(Below) This uranium mine uses wooden headframe, skip hoisting, and is typical of OME explorations.

sponsible for two programs, one to stimulate exploration for domestic mineral reserves, and the other to stabilize the mining of lead and zinc by small domestic producers.

In the past 2 years, OME approved 37 contracts for exploration work. Ten contracts were successful in finding ore having an estimated value of more than $13.5 million in recoverable minerals.

Production of lead and zinc by small domestic producers has benefited substantially and the economics of depressed mining areas have been aided by the Lead and Zinc Stabilization Program, which provides payments to qualified producers during periods of low metal prices.

Another domestic industry whose health and stability is of vital concern to the Nation is petroleum. For reasons of national security, the Oil Import Administration was established in 1959 by Presidential Proclamation, placed in the Department of the Interior, and charged with regulating the quantities of petroleum and its products that may be imported into the United States.

Should the United States be subjected to military attack, minerals and solid fuels would immediately become critical resources. The Office of Minerals and Solid Fuels, in addition to preparing the chapters of the National Plan for Emergency Preparedness dealing with these resources, has recommended establishment of an Emergency Minerals Administration and an Emergency Solid Fuels Administration. Currently in the process of formation, the two Administrations would direct the use of these resources toward survival and recovery of the Nation.

The Department's Office of Oil and Gas, in addition to its continuous appraisals of long and short term petroleum supply and demand, recruits, trains and maintains a standby staff for an Emergency Petroleum and Gas Administration. The latter is a readiness measure to assure the supply of petroleum, its products, and gas for military and essential civilian needs in any emergency.

The Office of Oil and Gas is represented on the Interstate Oil Compact Commission, which recently completed an analysis of the individual States' regulatory systems.

The vast network of 3.6 million miles of highways which connect our population centers with our unparalleled recreational resources, would be useless without an assured supply of motor fuel to power the 80 million vehicles in these United States.

The Earth Itself

A "good piece of geography" is basic—from there on, it's a matter of human wisdom

In the beginning of this Nation there was the land.

Broad, rich, seemingly endless, the earth beckoned early Americans toward the Pacific Ocean. On this solid soil, Americans began to build their fortune and their Nation. They lived close to the earth; they knew their dependence on it.

At the start, land meant only raw resources—a seeming infinity of grassy prairies, deep forests, wild rivers—an incredible array of minerals and wildlife. Men first spun dreams, then fortunes, from the furs, the forests, the rich veins of ore. Originally, the bounty of the country's commonly owned territory—most of the continent west of the Mississippi River—seemed inexhaustible. The lands were often treated accordingly.

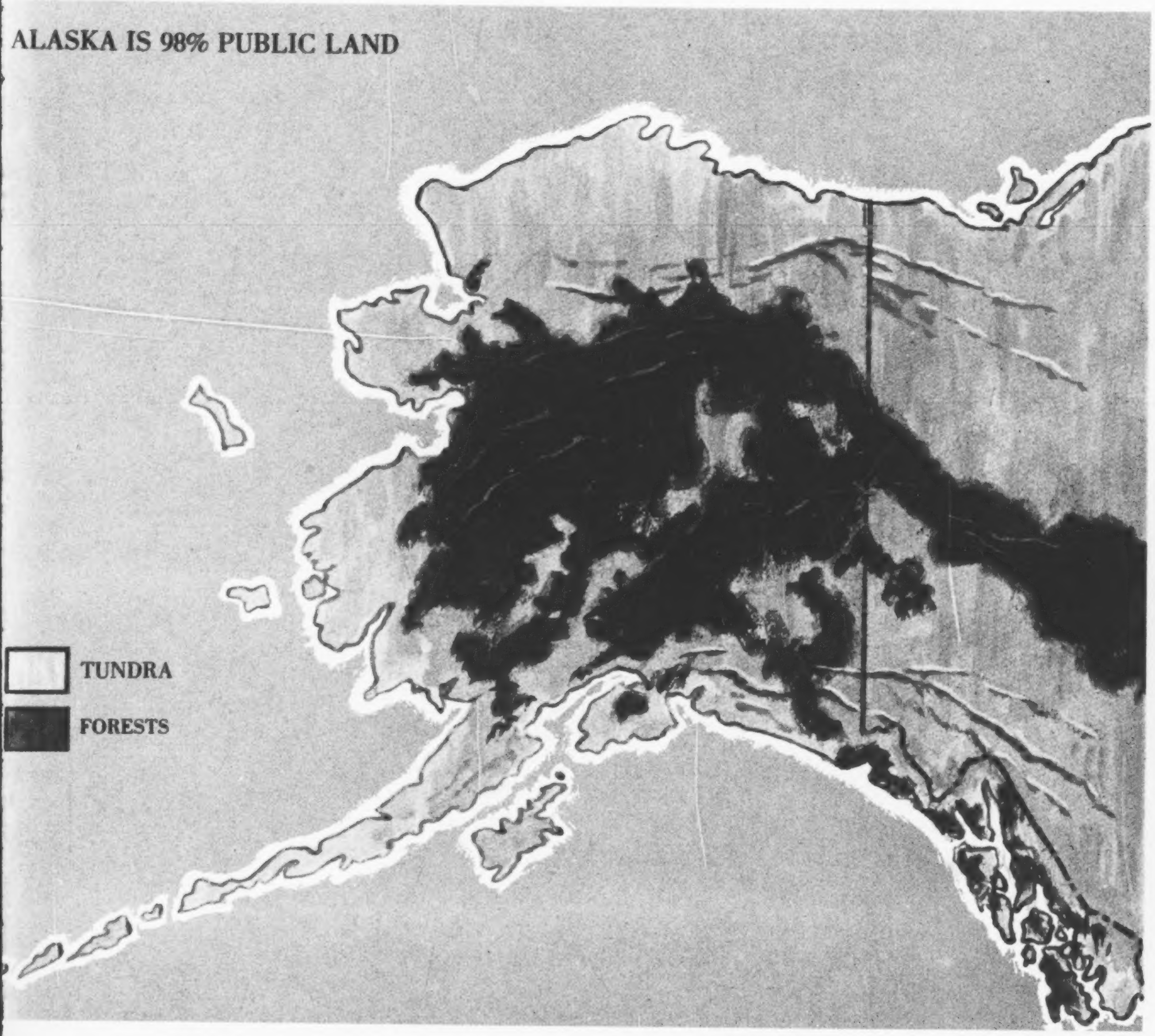
Gradually, the nature of our relationship to the land began to change. Where early homesteaders looked at their bread and saw behind it the earth, later Americans looked at their fortunes and saw them supported only by an intricate economic web . . . one that seemingly suspended them far above the land. But in spite of the sophistication of today's economy, the whole complex structure is still based on the "good piece of geography" which is America—and the quality of our future depends to an increasing degree on how we treat this land.

Today, only about one-fifth of the original public doman remains. A Nation with no more illusions of inexhaustible bounty, sees many of these lands severely damaged. With increasing resource demands from dense populations and land-gobbling cities, America today is taking a second look at the kind of lands and resources the early settlers bypassed, at semiarid regions that were plowed and then abandoned, at polluted rivers that have served industries as sewers, at burned-

Photo by Jack E. Boucher

49

REGIONS OF THE



over timberlands and a few remaining virgin forests, at wildlife, water, iron, ore, oil and gas.

It is still our natural resources that sustain us, the late President Kennedy reminded us, "but in turn, their continued availability must depend on our using them prudently, improving them wisely and where possible restoring them promptly."

The Bureau of Land Management (BLM) administers the public domain—175 million acres in the Western United States and 289 million acres in Alaska. Although predominantly arid or semiarid rangeland or tundra, the public lands nevertheless have 110 million acres of woodland protected against fire and insects, including 46 million acres of commercial forests, and more than 350 million acres which have wildlife, scenic and recreation values.

In addition to their value as a resource base for the future, these public lands are even now a substantial source of income to the Nation. In 1963 the raw materials taken from these lands directly involved industries employing more than 100,000 people. Oil and gas from public lands has a wellhead value of about $110 million. Lands managed by BLM produced 1.5 billion board feet of forest products valued at $37 million. Seven million head of livestock and nearly 3 million big-game animals used public land for all or part of their year-long needs. About 20 million Americans found the public lands just right for fishing, hunting, hiking and camping.

The process of transferring public lands out of Federal ownership is almost as old as the Nation. They have become farms, ranches, cities, or they have been withdrawn for special uses—National Forests, National Parks, Wildlife Refuges. This process of transferral will continue as necessary for the public interest.

Unfortunately, the hit and miss manner in which public lands have been dealt out of the Federal hand has made administration a severe problem. In working with marginal lands, management is the all-important key to unlocking wealth. The chopped-up, checkerboard nature of ownership has made effective management next to impossible.

To bring about more efficient administration, the Secretary of the Interior in December, 1963, instructed BLM to launch long-term management programs.

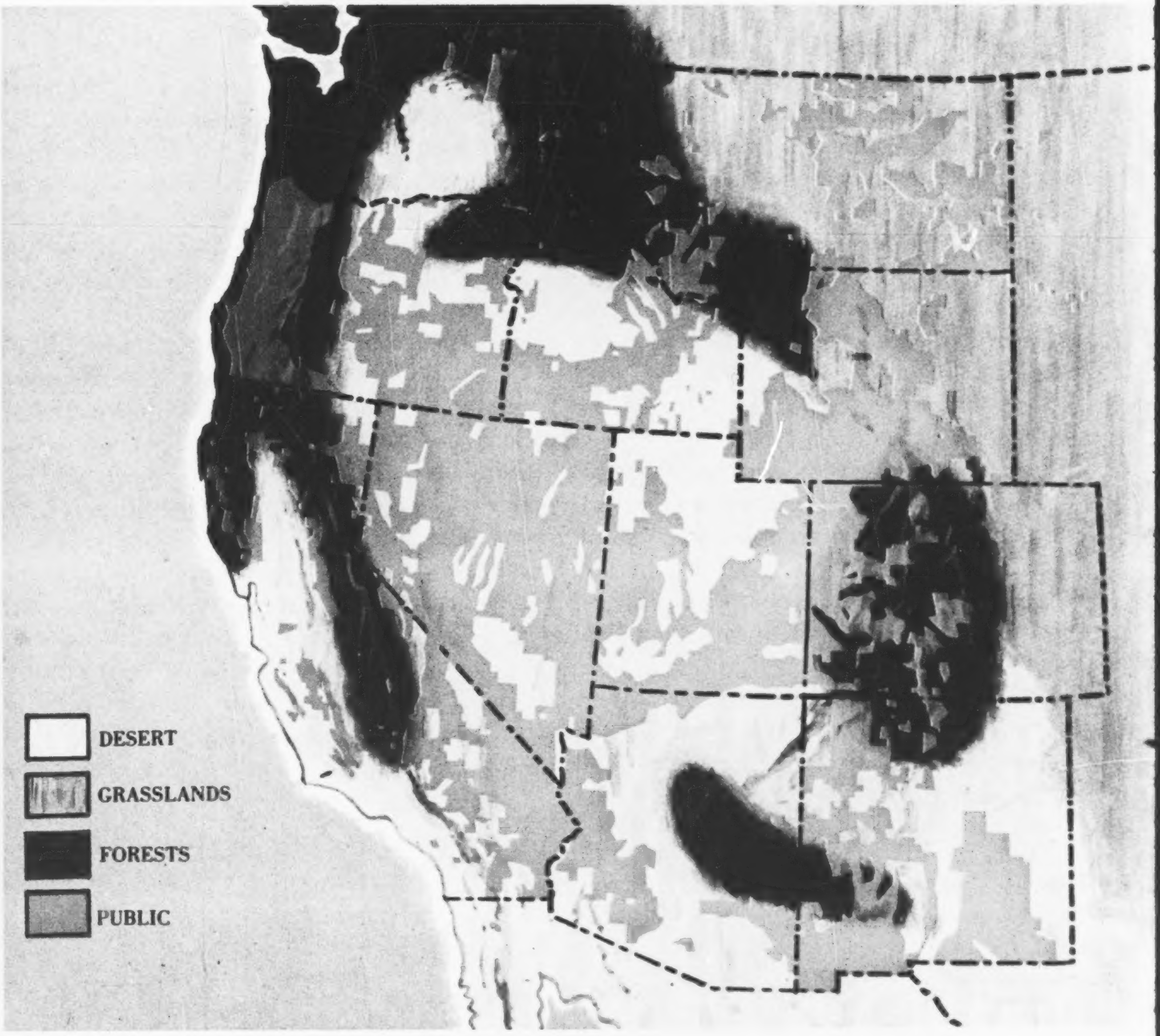
These preliminary actions involve division of the lands into three categories:

(1) Large concentrations of BLM-administered lands that are suited to intensive, multiple-use management programs and should stay in Federal ownership. About 70 percent of public lands, in 60 to 70 large concentrations composed of approximately 140 million acres (exclusive of Alaska), are in this category.

(2) Lesser concentrations of public lands, intermingled with private and other public holdings. About 25 million acres fit this category and close cooperation with the other administrative agencies involved will be required to establish effective management of this patchwork of private and public lands.

(3) Scattered, fragmented parcels of land, which should be steadily transferred out of BLM administration and into pri-

PUBLIC LANDS



vate or local government ownership. An estimated 10 million acres of "transfer areas" will serve the pressing social and economic demands of expanding western communities and outdoor recreation.

But something more was needed and that something lay in the hands of Congress. With a sweeping legislative stroke, Congress passed in September 1964 three new laws which steered the federally owned public domain into the conservation movement and brought these lands into the 20th Century. The bills are:

1. *Multiple Use*—Which directs management of public lands for varied uses and authorizes the Secretary of the Interior to classify these lands for retention in Federal ownership or disposal for community growth;

2. *Public Sale* Which authorizes sale of lands required and chiefly valuable for residential, agricultural, commercial, industrial or public use development and requires local governments to have zoning regulations in force prior to sale; and

3. *Public Land Law Review Commission*—Which establishes a commission to analyze the nearly 5,000 land laws now on the books (some over a century old) to present findings to Congress, and to recommend guidelines by which lands should be retained or disposed of for maximum public benefit.

To demonstrate what can be accomplished through modern management when the lands are concentrated enough to be manageable, BLM last year began a Resource Conservation Area Program. The so-called "RCA's" were established on some 85 public land bundles, ranging from a few hundred to a few thousand acres in the 10 Western States.

Signs, interpretive leaflets and colorful names such as Calamity Ridge in Colorado, Paradise Valley in Nevada and Spanish Spring in California, all helped identify for visitors these areas which will serve as testing grounds for management techniques.

Among the soaring values of public lands is their recreation potential. Acres of desert in riotous bloom, cool wooded camping spots, antelope poised at a stream's edge, clear air and brilliant sunsets—these are features that make our public domain, with its semiarid flavor, a perfect outdoor complement to our lush National Parks and Forests.

As part of the Nationwide Outdoor Recreation Plan, BLM is conducting an inventory of the recreation possibilities on its 464 million acres. Scheduled for 1966 completion, the search is literally "unearthing" thousands of individual areas of major significance for hunting, fishing, water sports, winter sports, rock collecting, camping, picnicking and hiking.

Accelerated Public Works funds in fiscal 1963 and 1964 underwrote recreation facilities at 49 sites in depressed counties of 8 Western States. In fiscal 1965, with its first Congressional appropriation for construction of basic protection and sanitation facilities at public land recreation sites, BLM will begin work on 14 sites in 10 States.

Local governments continue to benefit from the Recreation and Public Purposes Act of 1954, which together with the

1961 price schedule, allows them to buy public domain land for $2.50 an acre or lease at 25 cents an acre annually for recreation, education and public health purposes. In the past 2 years, more than 11,000 acres have been purchased and 90,000 acres leased to local governments. A cooperative State program for development of BLM recreation areas is underway in California and similar programs are being considered in other States. New regulations have opened nearly 500 million acres of public lands to hobby collectors of petrified wood.

One of the primary hurdles to thrifty use of public lands is lack of access. Since 1961, BLM has been acquiring permanent easements from neighboring private landowners and building roads and trails into areas where resource protection or public recreation warrants entry. At Dome Mountain, California, for example, 50,000 formerly inaccessible acres of prime deer hunting country will soon be opened by way of a road constructed with matching Federal and California funds.

As important as recreation is becoming, the major reason for improving access to our public lands is still protection. Fires, insects, forest diseases and unauthorized use are major causes of waste.

Airplanes spraying fire retardants and dropping "smoke jumpers" have effected a dramatic cut in timber losses.

Most spectacular of the destructive agents is fire, and BLM has made an equally spectacular record in combating this No. 1 hazard. Forming the backbone of this protection work is a fleet of helicopters and specially equipped airplanes which drop both fire retardants and teams of parachuting firefighters (known as "smoke jumpers") to attack fires while they are small and controllable. With a 403-million-acre area to police, BLM firefighters in 1963 extinguished 1,437 fires which burned a total of 323,354 acres and caused damage estimated at $3.4 million. In Alaska, where the fire toll had averaged 1 million acres annually, BLM reduced the loss to 14,000 acres in 1963.

Tree disease—mainly white pine blister rust—and insect infestations are the target of continuing control studies among BLM experts. These two menaces cause greater loss to forest resources than do the more dramatic fires.

An intensive program to enforce trespass regulations involving timber, grazing, occupancy, fire, minerals and antiquities also has contributed to the overall protection of our public land resources.

BLM has polished both sides of the fish and wildlife coin which enriches our public lands treasury. Brochures, available from BLM State offices, were prepared for several States, delineating attractive areas and major access routes and providing information about hunting and fishing . . . this for the sportsmen.

For the wildlife, BLM is equally solicitous. Almost 3 million big game animals on public lands consumed one-fourth of all the forage used last year. Projects to improve forage and habitat for wildlife were carried out all over the public lands, and studies now underway are aimed at more intensive range management.

Overuse of rangeland, loss of vegetative cover, excessive water run-off and severe soil erosion are being corrected through soil and moisture conservation programs. In 1963, 2 million acres were seeded, 1 million acres of brush were eliminated, 85,000 miles of truck trails were built, 714 miles of water-spreader dikes were constructed, 14,000 reservoirs were established and 15,000 springs were improved.

More than $11 million in Public Works Acceleration funds helped finance this work in 1963 and 1964.

This specially equipped truck helps fight a "wildfire" raging in the brush country near Ely, Nev., in 1963.

One of the Nation's most productive and valuable commercial forest properties is the 2 million-acre stand of high quality, old-growth Douglas fir in western Oregon and California, known as the O & C lands. The violence of a hurricane in October 1962 radically changed BLM's management of these lands to meet the emergency conditions. Following the storm, which blew down several billion board feet of timber, BLM faced the gigantic task of harvesting about 2 billion board feet, worth some $48 million, to save the timber from decay, beetle infestation, and fire. Emergency waivers of certain regulations and cooperation with public agencies and private companies resulted in accomplishing twice the normal workload in one year. During 1963 almost all the storm-damaged timber was salvaged and future plans for progressive management are being revised accordingly.

In the 9 years that BLM has administered leasing of the Outer Continental shelf, the Federal government has collected approximately $1.6 billion in cash bonuses and rentals, of which $761 million are funds held in escrow by the Federal

Photo by Jim Lee

When our public lands are properly tended, protected, and maintained, they offer unlimited recreation opportunities.

Blowdowns to earthquakes–

BLM timber managers survey the forest ruins following the hurricane which blew down billions of board feet.

The resource rangers who manage the public domain must keep in mind the many uses it is called upon to serve; these include wildlife, timber, minerals, soil and grazing.

government. About a million acres off Oregon and Washington were designated for lease in October 1964.

About 500 billion barrels of the oil locked up in coal shale in this country lies on public lands. Industry studies aimed at orderly development of this currently noncommercial resource are underway.

A bill passed by Congress in 1964 raised the coal lease limitations, contributing to the feasibility of producing supplemental thermal power production to be integrated with Colorado River hydroelectric projects.

On March 27, 1964, Alaska experienced the most severe earthquake that has occurred in the United States since the development of seismic-measuring instruments. In the hard-hit Anchorage area, Geological Survey geologists moved in immediately to determine the causes. A 35-page report, published soon after the quake, explained that most of the damage resulted from landslides in areas underlain by "Bootlegger Cove Clay," which had been described in a 1959 Geological Survey bulletin.

Survey scientists are advising with regard to reconstruction not only in Anchorage, but in several other affected areas. Information obtained by Survey teams will help other earthquake-prone areas to build and rebuild more securely.

The Alaska Railroad, which operates as part of the Department of the Interior, suffered damage to track, roadway and rolling stock for a rail distance of about 300 miles. A crash

Such scenes of neglect on public lands will be remedied soon with BLM's first funds for recreation facilities.

An Arizona Boy Scout enters one of the 85 new areas where BLM will concentrate conservation activities.

ENTERING
UPPER CENTENNIAL
RESOURCE
CONSERVATION AREA
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

nterior's land resource problems run the gamut

Photo by Jim Yoakum

Our rich legacy of public lands offers a stimulating range of uses to the dedicated outdoorsman. They can be a nature laboratory for tree farming or rock hounding or they can serve the human spirit by furnishing it with silence and space and beauty.

program and herculean efforts brought rapid resumption of service but it will take all of 1965 plus about $27 million to put the railroad back in pre-earthquake condition.

Immediately following the quake, the Undersecretary of Interior and other Departmental officials flew to Alaska to organize Interior's relief and reconstruction efforts. The President established the Federal Reconstruction and Development Planning Commission for Alaska with Senator Clinton Anderson of New Mexico as chairman and heads of principal Federal agencies operating in Alaska as members. A counterpart committee was established in Alaska with Interior's Regional Coordinator as chairman.

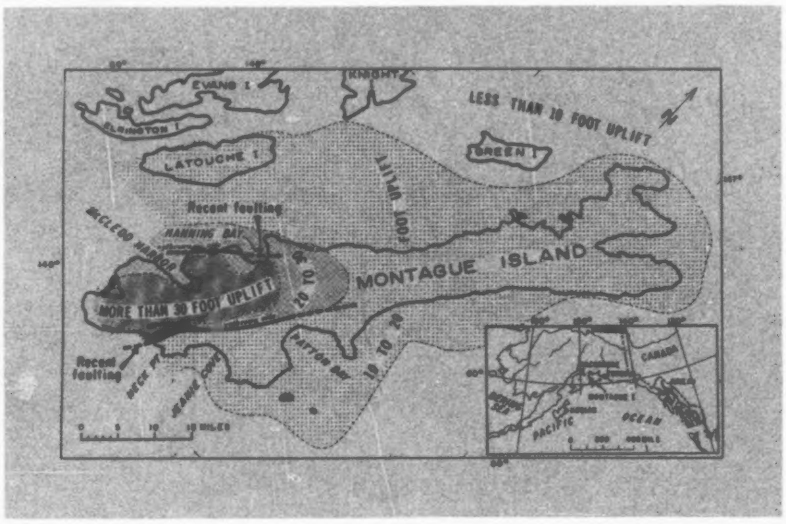
Relief activities were phased out in the summer of 1964, but the reconstruction job continued in full operation.

The Survey continued to contribute to the Atomic Energy Commission's Plowshare Program, concerned with the peaceful uses of nuclear explosions, through the selection of sites potentially useful for experiments and through detailed studies of the geology and hydrology of explosion sites.

In 1964, the Survey published 1, 743 new topographic maps and brought 280 more up to date.

Whether the immediate benefit accrues to a single picnicker, to an entire city or to a crippled, shaken State, the Department of the Interior is present, concerning itself with the preservation, investigation, repair, understanding, or just wise use of our land resources.

Extent of the disturbance caused by Alaska's quake can be seen on this map. Houses at right were perched on a "slumped block" facing Cook Inlet, Anchorage.


EVANS I
KNIGHT
ELRINGTON I
LATOUCHE I
LESS THAN 10 FOOT UPLIFT
GREEN I
Recent faulting
McCLEOD HARBOR
HANNING BAY
FOOT UPLIFT
MONTAGUE ISLAND
MORE THAN 30 FOOT UPLIFT
20 TO 30
10 TO 20
PATTON BAY
Recent faulting
NECK PT
JEANIE COVE
0 5 10 15 MILES
CANADA
PACIFIC
OCEAN

The baton of Nature—the symphony of Life

To Each His Place

As America's outdoors shrinks, man is at last giving serious consideration to the wild creatures that depend on it for their very lives. If the chirp of the prairie dog and the honk of a Canada goose are not to become oddities heard only on archive tape recorders, this lately learned lesson is essential.

Protection of our precious fish and wildlife resources is the primary concern of the Bureau of Sport Fisheries and Wildlife (BFSW) and the Bureau of Commercial Fisheries (BCF); the increasingly creative means by which they are performing this modern miracle are being applied from mountaintops to ocean floors.

The sledgehammer impact of civilization on wildlife has been softened significantly by BSFW programs, geared in many cases to State fish and wildlife programs and aimed at helping fit our wild contemporaries into the ever-changing conditions we impose on them. Crowded by suburbs, jostled by highways, displaced by airports and industries, much of our Nation's once teeming wildlife literally has its back to the wall.

Designed by nature to be residents of wilderness, needing clear water and clean air, these creatures today find less and less of the environment they require to survive. Some already have toppled over the brink into extinction. Many of those remaining need help. There was a day in the not too far distant past when certain big power and irrigation projects meant ruin to existing fisheries, jeopardy to important fish runs, eradication of inland spawning areas or waterfowl wintering grounds, and serious damage to upland and big-game animals.

Salmon present an awesome sight as they obey nature, swarm back to their birthplace, lay their eggs, and die.

Photo by Steven Wilson

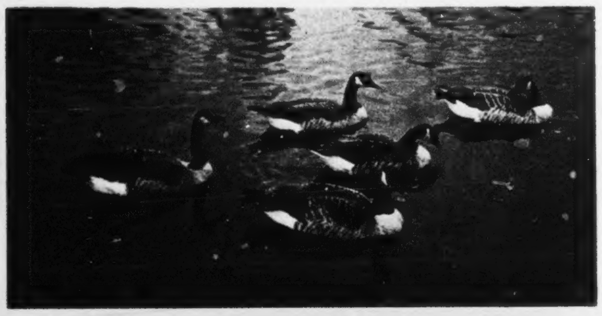
Today, the Bureau of Sport Fisheries and Wildlife is a partner in water projects, not just stopping destruction, but actually in many instances creating fish and wildlife habitat where it had existed only marginally or not at all.

The phenomenenal 1964 rainbow trout fishing in Flaming Gorge Reservoir was the result of a management program initiated by BSFW and the States of Utah and Wyoming in 1963. Flaming Gorge, on the Green River in Wyoming and Utah, is a major unit of the Bureau of Reclamation's Colorado River Storage Project. BSFW and the respective States' fish and game departments have signed agreements to study management of river and reservoir fisheries in an attempt to assure anglers many more years of excellent fishing. The average catch for 4 hours of angler effort at Flaming Gorge was 4.4 fish. More than half a million trout were caught there in 1964.

The ups and downs of our waterfowl very often depend on the ups and downs of the water levels in their wintering grounds. Normal fluctuation is necessary to promote food plant growth. In 1964, the Department of the Interior and the U.S. Army Corps of Engineers entered a cooperative agreement to assure this necessary rise and fall of water at

(Above) An Everglades kite surveys a last remnant of the environment he must have if he is to survive.

(Below) The Canada goose is one of the largest of all waterfowl hunting targets.



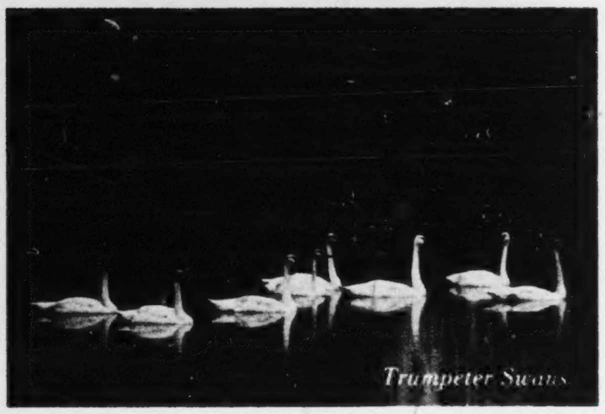
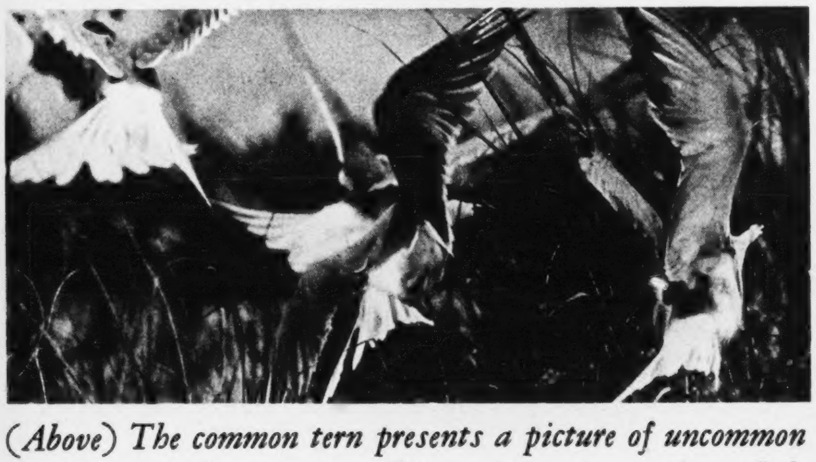


Photo by Jim Yoakum

(Above) The trumpeter swan, once almost extinct, has made a dramatic comeback.



(Above) The common tern presents a picture of uncommon loveliness as he rises from his nesting site on Cape Cod.

(Right) A couple of Canada goose parents shepherd the lineup as it embarks on its mid-afternoon snack run.

Catahoula Lake in Louisiana, one of the Nation's excellent waterfowl wintering grounds. The Bureau of Sport Fisheries and Wildlife suggested basic changes in the navigation project's engineering plan, not only saving the waterfowl values of the lake, but improving the navigability of the stream below Jonesville, La.

Herds of mule deer stood to be the largest losers when the Bureau of Reclamation Navajo Project in New Mexico and Arizona inundated 16,000 acres of prime wild range. But thanks to cooperative action by Federal and State agencies, 60,000 acres of land adjacent to the reservoir have been set aside as a substitute range for the displaced deer and other wildlife.

Again, fish and wildlife were present at the head table when the planners of Jackson Lock and Dam on three Alabama rivers mapped their project. The Corps of Engineers and BSFW cooperated to set up the Choctaw National Wildlife Refuge as an integral part of the project.

On hundreds of smaller federally financed land-use projects—watershed improvement, wetland drainage, highway construction, area redevelopment, and urban renewal—fish and wildlife conservation is a prime consideration. Human pressures continue to increase, but the pressure on non-human creatures is being lessened, at least to some extent.

The backbone of our migratory bird resource is the BSFW system of waterfowl refuges, and the Bureau's regulatory and enforcement programs.

A bird or game refuge is more than a blessed place of respite for wild creatures in their fight against man for survival. Like most of the federally financed programs undertaken by Department of Interior agencies, these tend to more than repay the initial cost—actually creating human wealth along with wildlife welfare. A recent University of Wisconsin study showed that in a single year nearly 80,000 persons traveled an aggregate of 2.7 million miles just to watch the geese at Horicon Marsh in Wisconsin, of which Horicon National Wildlife Refuge is a key part. More than half that many came to hunt ducks and geese on the open portions of the area and paid local farmers some $60,000 to hunt. Merchants sold another half million dollars worth of goods and services to these who came just for recreation.

Four waterfowl refuges were staffed and development started in 1964; five others were authorized for acquisition by the Migratory Bird Conservation Commission.

Three species of birds that appeared to be losing the battle for survival—Aleutian Canada goose, Everglade kite and whooping crane—are being helped in their struggle for existence by refuge personnel and BSFW research scientists. An-

other species once endangered—the magnificent trumpeter swan—has been saved. This year a number of these birds were transplanted to the northern prairies, part of their historic range.

Harvestable surplus of game birds is determined by numerous systematic studies, and hunting regulations are dictated by the findings. Illicit activities by commercial duck trappers and market hunters could be a serious drain on waterfowl populations and hunting regulations must be vigorously enforced. Seven thousand arrests of run-of-the-mill violators were made in 1964.

In counties where refuges are located, roads and schools receive one-fourth of the receipts from sale of timber and grazing rights and from oil royalties which are an incidental result of the refuge management program.

In a herculean effort to satisfy the demand of 30 million American anglers, a hundred national fish hatcheries broke production records in 1964, pouring millions of fish into waters on Federal lands. Scores of Indian agencies are receiving BSFW field assistance in developing their sport fishing potential. At Fort Apache Reservation alone, more than 200,000 anglers a year catch a half million trout. BSFW designed the fishery, showed where and how to build the lakes, demonstrated proper stocking and management, and supplied the fish stock.

The hatchery program for 90 years has been the key feature of Government's aid to the fish resource. This year a new hatchery was added at Jordan River, Michigan, to bolster the effort to restore the Great Lakes trout fishery ruined by the lamprey eel.

Farmers and ranchers in the South and Midwest have made increasing demands for channel catfish to stock their ponds and reservoirs. Increased hatchery production met these demands, adding a new sport and food dimension to these numerous, multi-purpose impoundments. Other warmwater species, such as bass and bluegill, also were produced in the increasing numbers needed to satisfy landowner demand.

A unique cold-water sport fishery is often found in the tailwaters below dams, and nearby National Fish Hatcheries in many cases are producing trout species at near-maximum capacity to stock these waters.

BSFW's handful of aquariums attract a million visitors a year and its wildlife refuge system draws more than 12 million. Visitor centers are being established on the Moosehorn (Maine), Blackwater (Maryland), and Seney (Michigan) National Wildlife Refuges. Centers are to open also at Craig Brook (Maine), Bowden (West Virginia), and Leetown (West Virginia) National Fish Hatcheries.

(Above left) This small wild dove, named for its mournful coo, looks happy as she tends her two fledglings.

(Above right) Patterns of motion and beauty are set by whistling swans in the skies over Cape Hatteras.

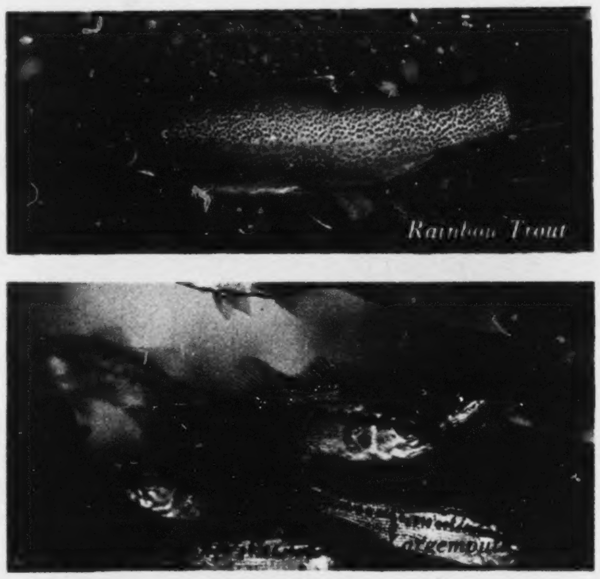
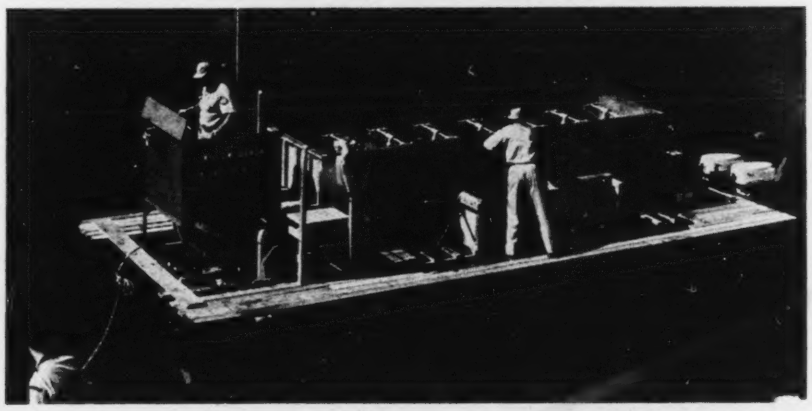


Photo by Jim Yoakum

(Above) Rainbow trout and largemouth bass are two of the game fish most popular with the nation's anglers. BSFW raises them in hatcheries and then plants them in streams and lakes for fun and food.



(Above) This unique boat was designed by BSFW so that rainbow trout could be planted in Lake Mojave. High surface temperatures make it necessary to introduce the fish into cool subsurface water via a long discharge tube.

Western public lands are rich in varied life

Male Sage Grouse

ng Beaver

Mountain Goat

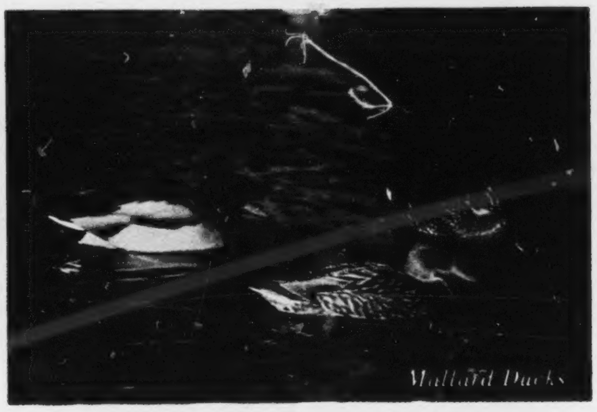
Jack Rabbit

Mountain Lion

Killdeer & Eg

Carib

Bobcat


Mallard Ducks

The increasingly worldwide concern for fish and wildlife conservation was underlined this year by establishment of an Office of Foreign Activities. The exchange is a fair one. BSFW scientists broaden their knowledge at the same time that they advise and counsel nations with newly-established natural resource programs. Africa, with its pressing wildlife and fisheries problems and lack of trained biologists and managers, has been the focal point of most of the activities of this new office.

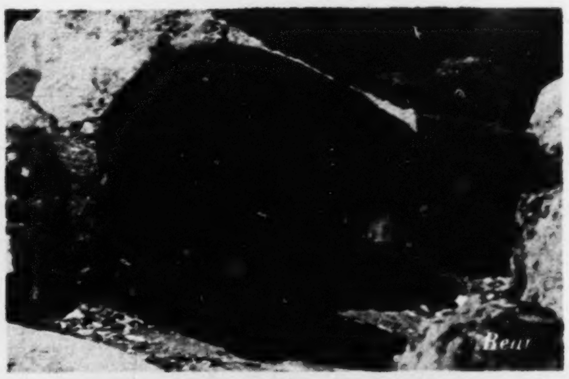
Long-deferred construction of fish and wildlife facilities, forest preservation, and provision of the first public use facilities on many wildlife refuges in the United States were made possible during 1963 and 1964 by more than $7.6 million in Accelerated Public Works funds. The grant-in-aid program of State fish and game commissions for restoration of fish and wildlife received major impetus with the allocation of more than $12 million in matching grants under the Accelerated Works Program. Forty-two States, two Territories, and the Commonwealth of Puerto Rico participated in the program.

One of the major worldwide tragedies today is the inability of the land portions of this earth to support the population. While man is creating new ways of stretching an acre's productivity, he is also producing 63 million more hungry mouths to feed every year. In the food race for survival, our eventual hope lies in the seas.

The Bureau of Commercial Fisheries is engaged in a vast research program that spans continents and plumbs the depths of our greatest oceans. Its objectives are as modest as aiding in the cooperative effort to reestablish the shad run in the Susquehanna River and as ambitious as attempting to supply the world's starving billion with life-sustaining protein. In the process of doing its day-to-day job, the Fish and Wildlife Service recognizes that fishing can be fun, it can be a very

Antelope Herd

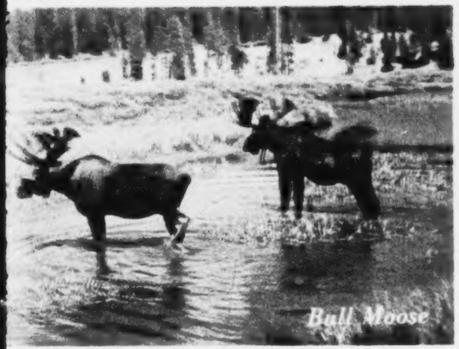
Ptarmigan



Bear

Silver Salmon

Dall Rams



Bull Moose

Wolf

important business, and it can also be a matter of life and death.

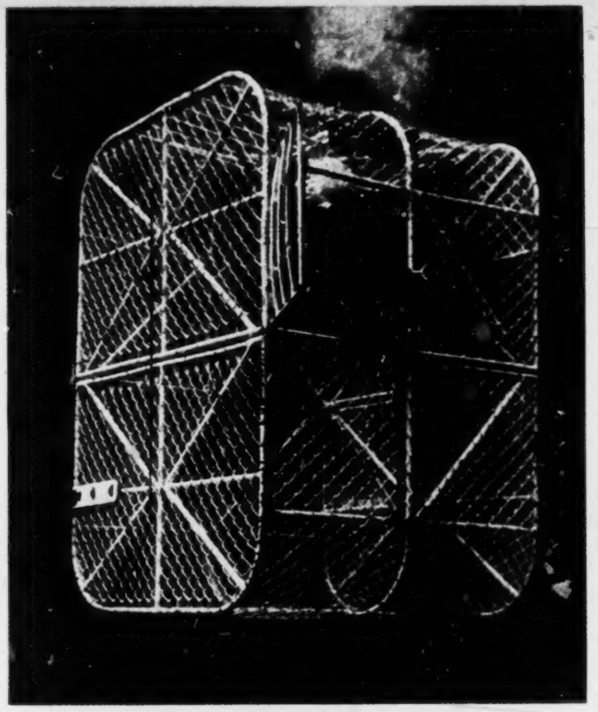
Most of Commercial Fisheries' business is not of such an urgent nature as the research to provide fish protein concentrate (known as FPC) to the more than 2 billion earthlings who do not receive enough protein to maintain a minimum balanced diet. With the world population expected to double again within 30 to 40 years, the land simply cannot be expected to produce the necessary protein.

FPC, in the form of a dehydrated powder, provides a tasteless, odorless way of adding vital protein to the starch or vegetable diets of the undernourished. Commercial Fisheries is working on various processes to produce a uniform, nutritious FPC. The National Academy of Science has named a panel to help review and guide the program. When a product which meets the high standards set by the panel is obtained, the Bureau will cooperate with the United Nations in field feasibility studies.

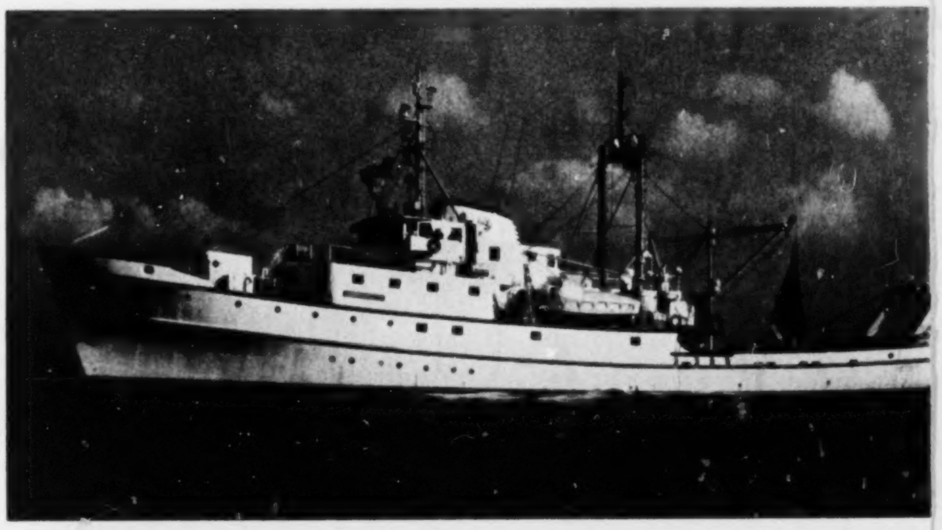
The importance of commercial fisheries to the world's food market as well as to our own economy has dictated an intricate web of activities, some of which are undertaken by the BCF alone, some in concert with other agencies or States, and some jointly with foreign countries. Scientists on the BCF staff represent many disciplines, from biology, oceanography, and chemistry to physics, engineering, economics and mathematics. BCF operates 27 large laboratories and 74 small stations and offices, as well as 29 vessels for gathering scientific data on commercially important fish.

At stake is no small enterprise. The annual harvest of fish and shellfish by this country's commercial fishermen is about 5 billion pounds, representing some 300 species and retailing for well over $1 billion. Eighty-five percent of this value is brought in by a mere 15 species—salmon and halibut in the

Radiobiologists from a BCF laboratory check distribution of radioactive materials previously put into this pond.



BCF divers observe underwater behavior of tuna in an effort to improve seining methods. Their cage is shark-proof.



(Right) Albatross IV, BCF's oceanographic research vessel, features new stern-trawl design for greater stability.

Pacific Northwest and Alaska, tuna in California, shrimp and menhaden in the Gulf of Mexico, South and Middle Atlantic, and haddock, ocean perch and lobsters in New England, plus oysters, scallops, crabs, clams, catfish, flounders and cod. The whale and fur seal, two very important mammals, also are harvested commercially, and BCF has management responsibilities for these.

To make the most successful development of the commercial fishing industry, BCF scientists delve into the behavior of aquatic organisms, the movements and activities of whole populations and sub-populations of these organisms, and their effects on commercial fish movements and concentrations. They study genetics and physiology and disease, pollution and other changes in the environment, and ways of preserving caught fish. All these studies arm our commercial fishermen with better means of making their industry profitable.

The addition of three oceanographic research vessels to the Nation's scientific fleet accelerated our high seas research.

At the Woods Hole Biological Laboratory the *Albatross IV*, the Bureau's first new fishery-oceanographic vessel in many years, was commissioned May 9, 1963. This 187-foot vessel has a cruising range of 9,000 nautical miles and its somewhat revolutionary design allows fishing and processing of catches to take place without interruption on rough seas. The fishing industry has noted the increased efficiency of this design and already has built a similar vessel.

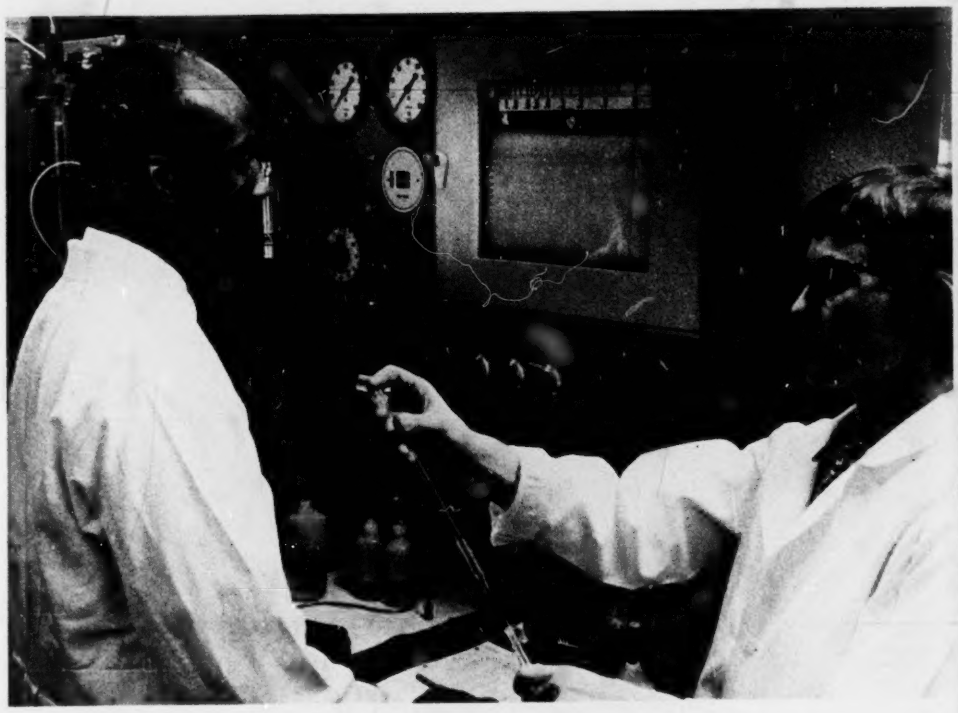
In Hawaii, in 1963, a 565-ton modern oceanographic research vessel, the *Townsend Cromwell*, was added to the scientific fleet. The 158-foot ship has a cruising range of 10,000 miles and is equipped for a wide variety of scientific missions anywhere on the world's oceans under the most severe weather and sea conditions.

The *Geronimo*, a 43-foot surplus Navy tug, was converted into a fishery-oceanographic research vessel for Bureau use in the multi-nation oceanography program to study the tropical Atlantic. In the summer of 1963, the *Geronimo* played an important role in this program, known as the International Cooperative Investigation of the Tropical Atlantic, off the west coast of Africa. The *Geronimo's* studies and findings were coordinated with those made by scientists aboard 10 other vessels from 7 nations.

Exploration for new fish and shellfish resources that would be available to commercial fishermen from the United States has been conducted for several years along the Atlantic and Pacific coasts, the northeast coast of Latin America and in the Caribbean. Extensive shrimp beds off Surinam and the Guianas were discovered by BCF's exploratory vessel, *Oregon*, in 1962. Newly discovered trawling areas off Brazil have yielded several types of snappers, large sea trout, croakers and sea catfishes—the largest catches ranging from 800 to 1,500 pounds of fish per drag.

High dams and storage reservoirs solve many an electrical

A microbiologist takes the bacterial count of crabmeat irradiated with Cobalt-60 as part of a BCF preservation method study.



Chemists at a Bureau of Commercial Fisheries laboratory check nutritive value of fish protein concentrate solution.

(Left) Haul seine experiments have improved harvesting efficiency for rice farmers who raise fish in their ponds.

and irrigation problem, but they present more problems than they solve to migratory fish, such as the commercially and recreationally valuable salmon of the Pacific Northwest.

BCF, in cooperation with Washington, Oregon and Idaho is developing methods of collecting young and adult salmon, learning the effects of large dams on both upstream, and downstream fish migrations, and guiding these migratory fish to safe by-passes.

Fish diseases, which tend to develop in the fish passage situations and in the supplemental hatcheries built near dams, have responded well to measures worked out by BSFW scientists. Because of the length (as much as 50 miles) of still waters along the rivers in reservoirs behind high dams, fingerlings are failing to find their way downstream—the old guiding force of the current being absent.

Four power companies with dams on the Susquehanna River have financed a research program which seems destined to restore the river's shad run. BCF, in cooperation with Pennsylvania, Maryland and New York, planted 11 million shad eggs from the Columbia River at various points in the Susquehanna in 1963 and a good hatch of shad resulted.

Research to control the oyster drill—one of the peskiest predators known to shellfishermen—and artificial culture of oysters and clams is going forward at BCF's laboratory in Milford, Connecticut.

Present knowledge, if applied, could substantially improve shellfish culture and increase production, and a Shellfish Advisory Service was established by BCF in 1963 to encourage practical application by industry of research data.

Another area of Commerical Fisheries research involves fish oils. They have been found adaptable to the formation of new and unusual chemicals and research continues on their use in such fields as plastics, detergents and protective coatings.

Commercial fishermen have a term for the length of time fish can be kept fresh under the best refrigerated conditions. They call it "shelf life." Normal shelf life is 14 to 21 days, but BCF scientists believe they have found a way to extend this period significantly by means of low-level irradiation. Laboratory tests have increased the shelf life of many refrigerated fishery products by as much as 30 days.

So successful was initial research that the U.S. Atomic Energy Commission is building a Marine Products Development Irradiator in Gloucester, Massachusetts. The Bureau will use this unit to study irradiation of raw fish under commercial conditions (1,000 pounds an hour).

The Department of the Interior has personnel rooting hard for both sides in the wildlife game. Enhancement of habitat for birds, fish and animals and improvement of methods and facilities for fishermen and hunters result in benefits for each of these competing elements and add to the quality of the overall environment.

New methods, new melds may open up to man new worlds

Exploring

New Paths

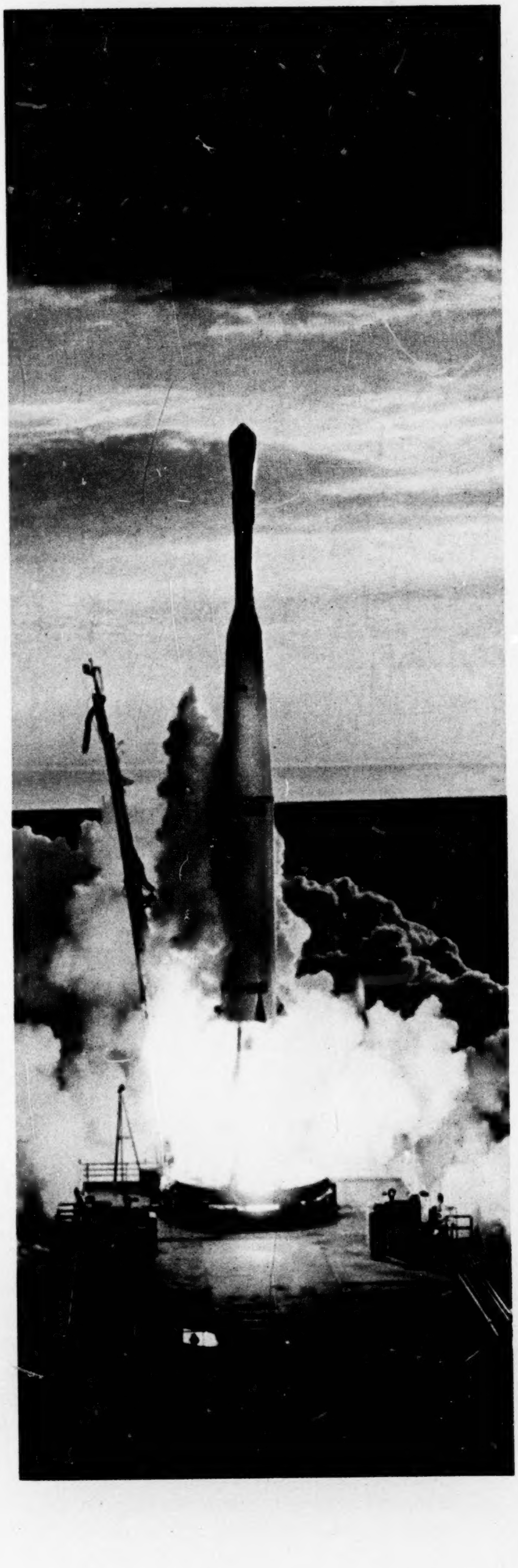


Photo by National Aeronautics and Space Administration

Research is a rubber band. It stretches exhaustible resources almost to inexhaustible limits. It gives renewable resources a magic elasticity, enabling them to serve many more uses in the course of a single cycle.

Once, our measuring tapes told us we would have exhausted many of our natural resource materials by now. Each year of patient probing into the world around us has stretched the lead time—has put off the day of crucial shortages of nonrenewable reserves.

Today, the elastic effects of research appear potentially infinite. Currently we are finding it economically attractive to extract iron from a low-grade ore known as taconite—too iron-poor to be considered a "resource" until technological research and diminishing stocks of high-grade ore made extraction a paying proposition.

We are told that tomorrow "common rock" may give up all the minerals we need to keep an increasingly sophisticated society afloat—that advanced techniques will make it feasible to take our fresh water directly from the sea without assistance from the clouds—that extra high-voltage power transmission can and will integrate widely separated regions and

This spectrozonal image of the moon was made from photos taken at Mt. Wilson observatory. Colors show various intensities of reflected sunlight. Such composite images add to our ability to discriminate like and unlike surfaces and speed the day when man will set foot on the moon.

Photo by Aeroneutronics Division, Ford Motor Co.

U.S. astronauts began formal geology training in February 1964. Their first field trip was to Grand Canyon, where astronaut Charles Bassett (right) is with USGS geologist Dale Jackson, who led a rock hunt.

stretch out the power potential into a slender, silent servant of modern civilization. Much difficult research remains, but the possibilities have been recognized, and in the past such recognition has been tantamount to eventual reality.

While each of Interior's bureaus and offices has a well-defined mission, many of them are exploring undefined paths in the hope of finding new uses, new applications, new resource-stretchers—in some cases, brand new resources.

Geology moved into the Space Age when the stunning success of the Ranger 7 drew widespread attention to scientists and organizations involved in mapping and interpretation of the lunar surface—essentials for eventual manned flights to the moon.

Playing a significant part in NASA's Apollo Program are scientists and technicians of the Geological Survey's Branch of Astrogeology, whose chief is one of five lunar scientists evaluating photographs taken by Ranger 7. The photos are an aid in final site selection for the Apollo man-on-the-moon landing mission.

On behalf of NASA, Survey astrogeologists are carrying out a number of studies and projects which include the preparation of geologic interpretive maps of the lunar surface, laboratory and field instruction in geology for our Nation's astronauts, and detailed studies of "tektites"—tiny fragments from space believed to be of lunar origin.

In fiscal 1964, astrogeologists were working on the completion of geologic maps covering approximately 700,000 square miles of lunar surface. When the project is completed, approximately 9 million square miles of moon surface will have been mapped at a scale where 1 inch represents 16 miles. The area involved is approximately that of the entire North American continent.

In August 1964, ground-breaking ceremonies were held for a new building near Flagstaff, Arizona, to house the Survey's laboratories and administrative offices.

One of the rich natural resources of this nature-blessed Nation is its abundance of wildlife. Another giant plus is our tremendous capacity to produce food. Since World War II, great strides have been made in controlling insects and other pests which cut into our agricultural output, and the result has been record-breaking production of plump, unblemished crops and produce.

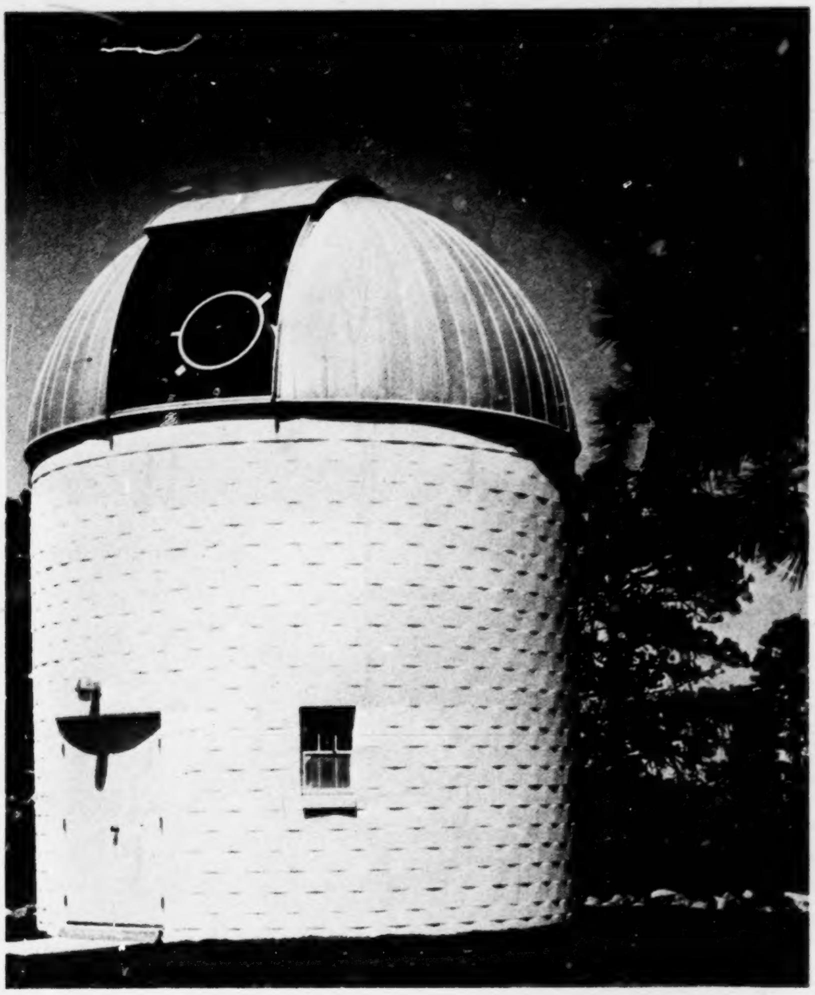
Recently, however, increasingly distressing signs have alerted many to the possibility that we may be paying too high a price for our bursting ears of corn and glossy leaves of spinach.

Effects on fish and wildlife from the widespread use of chemical pesticides have yet to be determined, but the Interior Department's Bureau of Sport Fisheries and Wildlife (BSFW) is on the way to some indisputable answers.

In 1964, a new fish pesticides laboratory at Columbia, Missouri, was authorized. Meanwhile, research continues at a stepped-up pace at BSFW's new Pesticides Research Laboratory at the Patuxent Wildlife Research Center in Laurel, Maryland, and at the Denver Center where both controlled and field tests

Lunar geology is studied here "three dimensionally" by forming a stereoscopic model from two moon photos.

A USGS astrogeologist points to the moon crater, Tycho, possible source of tektites, one of which he is holding.



The job of mapping the moon in preparation for landing by man depended on such installations as this new USGS telescope observatory built in 1964 at Flagstaff, Arizona.

are determining the effects on wild game birds of some 70 of the more widely used chemicals.

Last year, BSFW research biologists and chemists collected and analyzed hundreds of fishes, birds, mammals and food organisms. Findings showed that pesticide poisons are present in the eggs, tissues, and vital organs of numerous species from practically all parts of the country and several Canadian provinces.

DDT residues, for example, were present in 36 of 37 clutches of wild black duck eggs, taken in 8 States from Maine to Maryland. Poison levels in a number of cases were higher than is allowed in domestic meats. No regulation of pesticide content exists over game shot by hunters. But how healthy can it be to eat meat that would not pass government standards? And what effect will the continued widespread use of pesticides have on the future of our birds and mammals and fish? Pronounced effects on the survival and reproduction of quail and pheasants have been shown in countless BSFW experiments.

In September, 1964, Secretary Udall issued stringent rules regarding use of pesticides on the more than 550 million acres of public lands administered by the Department of the Interior. The order directed that first priority be given to nonchemical methods of pest control. When chemicals are deemed necessary, safety will be the main consideration.

In the intensifying search for safe chemicals to control pests, several breakthroughs have occurred. One such is "Sevin," an insecticide which appears to have little toxic effect on birds and mammals. It has what is known as an "unstable composition," which means that it tends to break down into a neutral, nonpoisonous state shortly after application. Thus, it acts like a short-range, point-blank pistol on the pests at which it is aimed, rather than like a shotgun which might "scatter" serious injuries among innocent wildlife bystanders.

The wildlife which must share their habitat with so-called "pests and varmints"—and even some of the vermin themselves—received a helping hand from the Advisory Board on Wildlife Management, appointed by Secretary Udall. The Board's study of predator and rodent control in the United States, released in March 1964, took the position that all native animals—even starlings and coyotes—are resources of inherent interest and value to the people of the United States. Basic government policy, the report stated, should be one of husbandry of all forms of wildlife. Local population control, where significant damage is being caused or human health endangered, should be limited strictly to the troublesome species, preferably to the troublesome *individuals*.

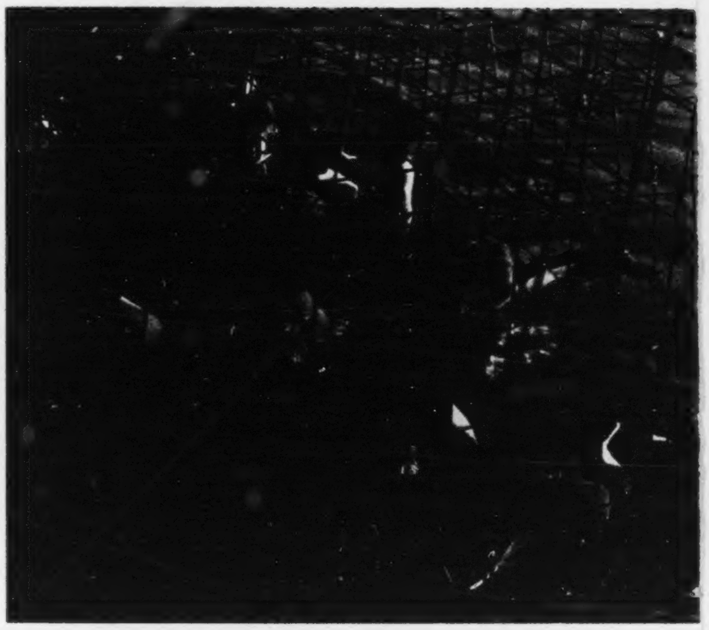
Not all our birds and animals are loveable. Sheepmen see little charm in coyotes. Pocket gophers and rats are entrancing mainly to other rats and gophers. Farmers lose little love on either, nor on the hawks and owls they attract. But improved methods of controlling these damage-doers have resulted from recent research, and the new methods are cutting down appreciably on damage to beneficial or merely delightful forms of field, stream and air life.

Unflagging research–

(Above) These houses now cover what was once a duck marsh. This development is typical of the pre-emption of waterfowl habitat by housing and industry.

(Left) Some of BSFW's research helps us to understand human diseases. Other projects merely aim to swell the angler's catch.

(Right) In 1964 BSFW extended its waterfowl banding effort into Mexico. Information developed will aid in Pacific Flyway management.



A dramatic example of BSFW research with the successful field test over a 720-square-mile area of New Mexico of a chemical sterilant to limit production of coyotes. In the treated area, 80 percent fewer coyote pups were produced.

Selective chemicals to control nuisance birds and mammals without endangering other species were advanced and a promising gopher- and rat-control compound which appears practically harmless to other animals is now in the field test stage.

Drugs used in fishery management underwent intensive study at the Bureau's Fish Control Laboratory in Wisconsin, with 64 of the 400 tested found worthy of further screening.

Bird-banding, for which the Bureau acts as the national clearing house, continues to furnish the information needed to keep track of populations, determine hunting seasons, and spot declining species before they become endangered. Data obtained in 1963 through the mallard duck research program confirmed that if the 1962 hunting season's kill had not been reduced substantially, the already-low mallard population would have continued its downward trend.

The Northern Prairie Wildlife Research Center near Woodworth, North Dakota, began limited operation toward a full program of waterfowl research.

A biological survey of coastal water sharks, from Maine to Chesapeake Bay, was undertaken by Sandy Hook Marine Laboratory in response to the rapidly growing interest by sport fishermen in sport fishing for sharks.

Numerous other experiments—from filtering and reuse of fish hatchery water to hybridization of warm-water fishes—are helping the Bureau of Sport Fisheries and Wildlife understand and deal intelligently with our important fish and wildlife resources.

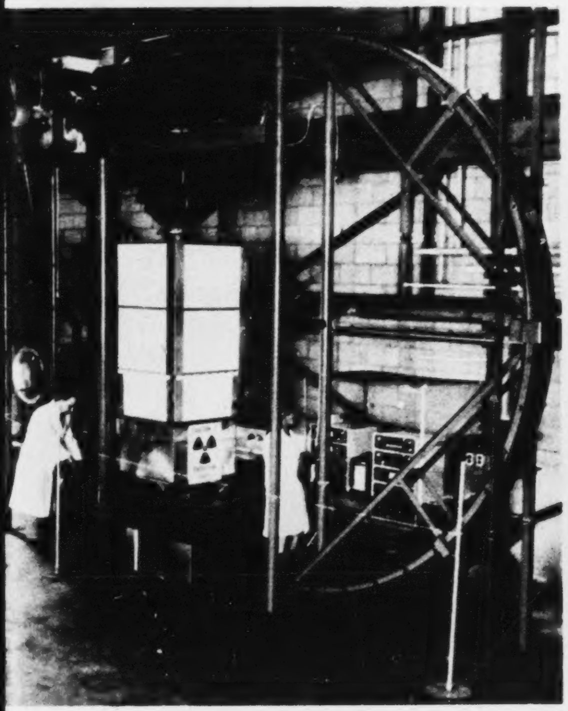
Man's knowledge of cancer, blindness and respiratory diseases in humans also is being implemented by BSFW research. A project with experimentally induced cancer in rainbow trout has established the fact that trout tumor is not transmitted from one fish to another except by transplants.

Fish proved such satisfactory test animals that BSFW scientists plan to develop special strains of experimental fish at the Fish Genetics Laboratory now being established at Beulah, Wyoming.

Programs on diseases common to both man and wild animals also are being conducted at BSFW's Patuxent Wildlife Research Center in Maryland. Among the various agencies collaborating in such studies are the National Institutes of Health, the Armed Forces Institute of Pathology and Johns Hopkins University.

A direct attack on histoplasmosis—a fungus disease of the lungs carried by a number of species of birds and mammals—is being waged by BSFW scientists in concert with the U.S. Pub-

The key which will unlock tomorrow's resources



(Above) This Bureau of Mines pilot plant was built to test a neutron radiation method of measuring moisture content of coal as it emerges from a preparation plant.

From this control room, metallurgists generate the Bureau of Mines' high-pressure experimental blast furnace in a search for better iron-making methods.

lic Health Service and State and local governments. Spores of this disease develop in bird guano deposits and the effort is to find and then dislodge concentrated roosts of pigeons and starlings.

Mineralogy is another area where research is making impressive contibutions to conservation. In this field, technology first gained enthusiastic acceptance, then languished.

Today a resurgence of belief in technology has stemmed from such confidence-renewing discoveries as how to turn porphyry rock and sea water into primary sources of copper and magnesium. Significant developments in mineral research are challenging and spurring the imaginations of scientists and engineers alike.

The tiny atom, which looms like a colossus in fields ranging from space to medicine, is finding its niche among minerals, too. The largest gamma-ray irradiator of its kind in the world has been constructed at the Bureau of Mines Metallurgy Research Center in Albany, Oregon, to explore the possible use of radiation to speed or improve reactions in processing minerals and fuels.

Research workers there and at other Bureau of Mines installations are increasingly applying nuclear tools and techniques to obtain better understanding of the basic properties of different minerals and to study their behavior under a variety of conditions. This is the kind of fundamental understanding that leads to dramatic new ways of stretching our known resources.

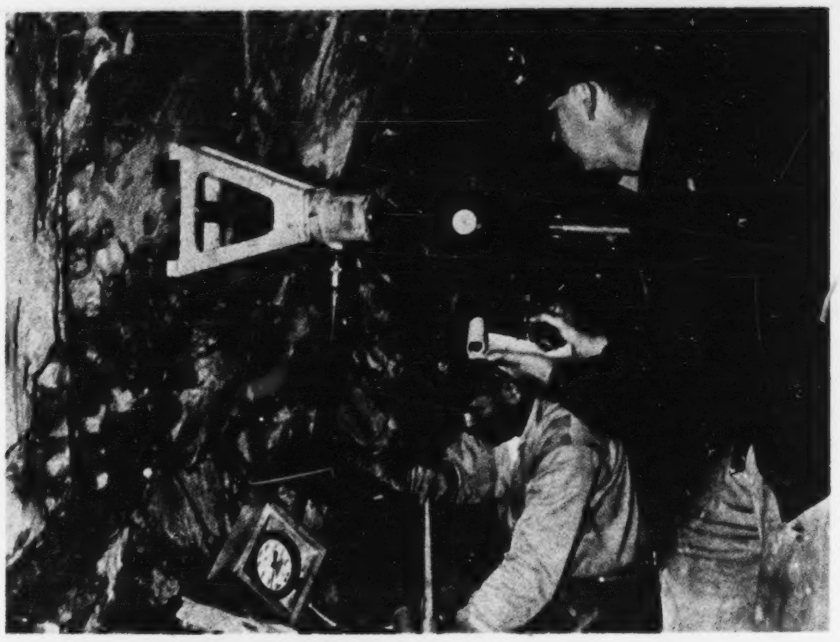
Since 1961 Bureau of Mines research has resulted in 30 U.S. patents on new methods, techniques, and equipment for extracting, processing or using mineral raw material. These are available for commercial use under license from the Department of the Interior.

Studies conducted by the Bureau with 22 major iron and steel producers are moving toward a new and vastly improved blast-furnace technology. Initiated in 1962, this cooperative research entered its second major phase in April 1963.

A new experimental blast furnace, designed to operate at the highest pressures ever used for iron-making in America, was "blown in" at the Bureau's research center in Bruceton, Pennsylvania. Experiments now in progress are providing knowledge from which can be built the world's most efficient and completely automated blast-furnace industry, producing at lower cost a better quality pig iron—essential ingredient of steel.

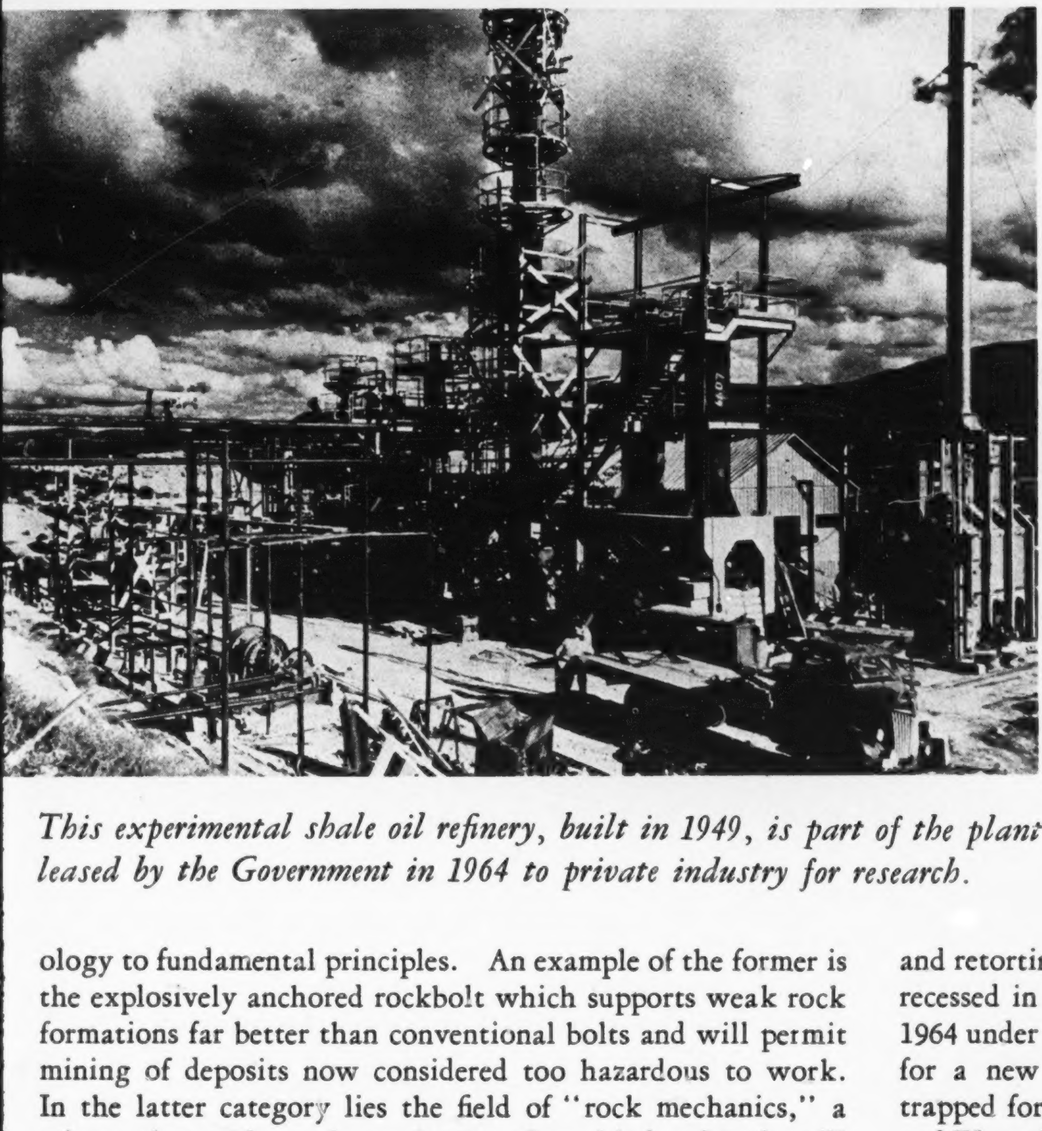
With waste metal becoming more and more of a landscape, as well as a resource problem, recent achievements in improving recovery of zinc and iron from waste materials and scrap are extremely important. A whole new technology may well develop out of current mining research.

Knowledge being extracted ranges from practical method-

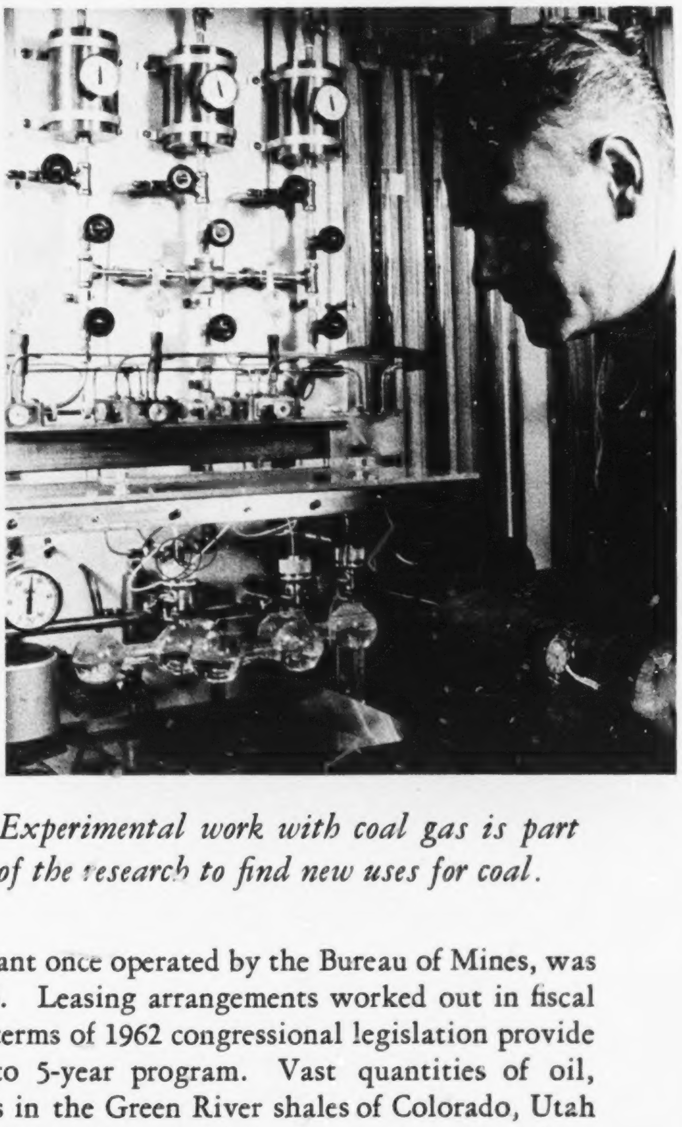


Freeing fuel to

The pulling force of this hydraulic jack has helped prove a new rockbelt anchoring method, making possible mining once considered too hazardous.



This experimental shale oil refinery, built in 1949, is part of the plant leased by the Government in 1964 to private industry for research.



Experimental work with coal gas is part of the research to find new uses for coal.

ology to fundamental principles. An example of the former is the explosively anchored rockbolt which supports weak rock formations far better than conventional bolts and will permit mining of deposits now considered too hazardous to work. In the latter category lies the field of "rock mechanics," a science that seeks to know how various kinds of rock will behave under different types of stress.

Bureau of Mines research has developed, in years of intensive study, the use of statistical-mathematical techniques to evaluate mineral deposits. This work, which is helping to transform mining from an ancient art to a modern science, has made the Bureau a mecca for mining engineers and scientists from all over the world.

The new mining technology now being forged in the laboratory and in the field will some day enable men to work deep in the earth despite the fierce heats and tremendous pressures they are certain to encounter there. It will permit extraction of more and more minerals from the seas and from miles beneath the ocean floors. Even the insubstantial air which now yields nitrogen and ammonia, will eventually become a general source of minerals.

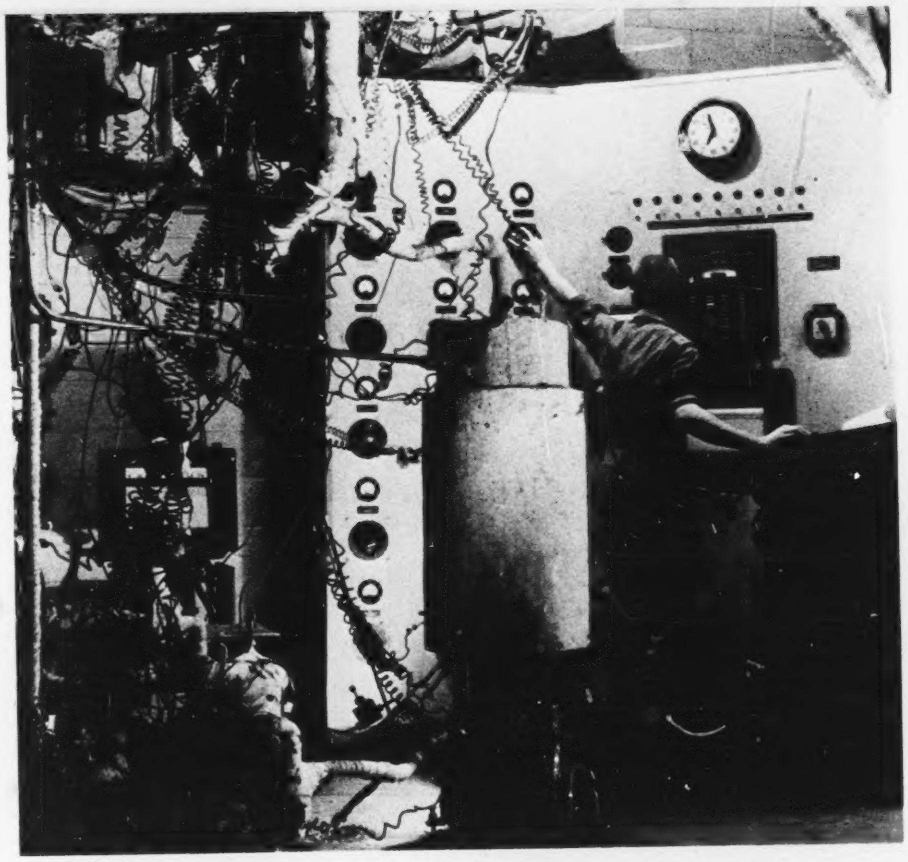
Oil shale research at the Rifle, Colorado, experimental mine and retorting plant once operated by the Bureau of Mines, was recessed in 1956. Leasing arrangements worked out in fiscal 1964 under the terms of 1962 congressional legislation provide for a new 2- to 5-year program. Vast quantities of oil, trapped for ages in the Green River shales of Colorado, Utah and Wyoming, will be the goal of intensive research in mining, crushing and retorting shale.

The richest fossil fuel supply in the Nation is coal. If the current rate of production were doubled, known recoverable reserves would still supply us for approximately 1,000 years.

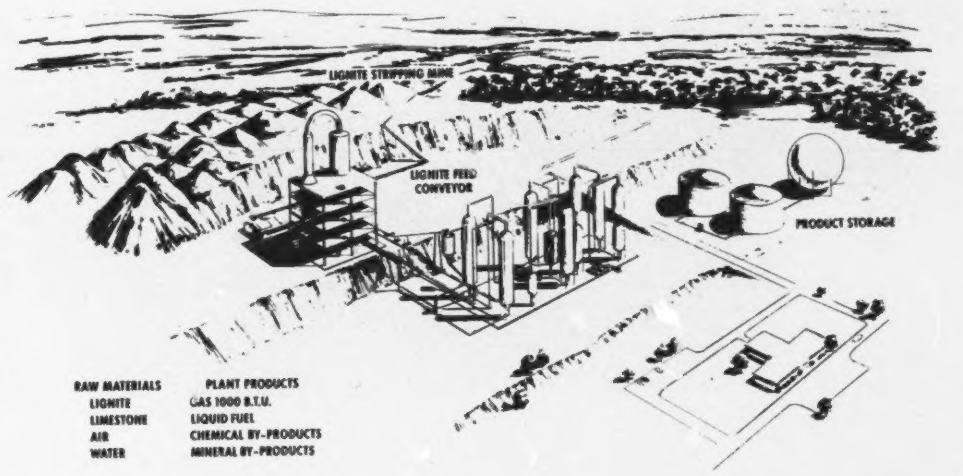
The Bureau of Mines research on coal includes more than 90 projects, aimed at increasing efficiency and at broadening markets for coal. Most exciting of the current projects is development of a coal-fired gas turbine to produce electrical energy. The turbine offers the possibility of boosting by as much as 10 percent the amount of power generated by a given quantity of coal.

Other promising developments include a process for converting lignite, with heat and pressure, into a high heating-value gas, which would mean a greatly increased use of this plentiful fuel resource; and invention of an "atomic meter"

ower hungry machines



This bench scale extract-dissolver produces the "hydrogenation feed" so essential to experimentation now underway to develop the final designs for the pilot plant below.



A research contract to work on this lignite gasification plant has been awarded and plans for final design are under study. The aim is to turn lignite into 100-octane gasoline.

that uses radioactive material to monitor the moisture content of coal moving through a preparation plant.

A promising new market for anthracite as a metallurgical fuel loomed as 1964 Bureau of Mines research on anthracite briquets for blast furnace use moved toward success.

The Office of Coal Research (OCR), charged with encouraging and stimulating production and utilization of coal in the United States, could point with pride in fiscal 1964 to the rising record of coal exports—immediately benefiting producers, railroads and miners.

Annual exports now amount to about 50 million tons. Instrumental in this gain, which means about $500 million of added exchange annually to this Nation for balance of payment purposes, was the September 1963 report of R. Nathan Associates to the OCR, "The Foreign Market Potential for United States Coal."

By contracting with outstanding experts and scientific organizations, the OCR is bringing an increasing variety of technical disciplines to bear on the long-standing problems of the coal industry. The Nathan Report is an example of this talent, being committed to the solution of the Nation's coal problems through the Office of Coal Research.

OCR research falls into two broad categories—projects aimed at increased coal values through greater efficiency in coal production and transportation and projects which increase its actual resource value.

In the former category, research is underway for conversion of coal near the mine-mouth to more transportable forms such as liquids, gases, and electricity. Projects to increase efficiency of coal-use in existing markets include development of a package coal-fired boiler which has resulted in increased coal use and gives promise of adding 3 to 4 million tons of annual fuel consumption to the market.

A fuel-cell project now underway aims at chemical conversion of coal to electric energy at 50 to 60 percent efficiency, compared to 40 percent achieved by combustion. Another project seeks to use fine-sized coal for treatment of sewage and industrial wastes, and then using the resulting coal-sewage material to generate heat and steam.

Several major scientific organizations are working under contract to OCR at converting coal to pipeline gas, industrial fuel gas, hydrogen and liquid refinery and blending stocks.

The Geological Survey takes an active role in mineral research. The Survey's approach on the one hand is develop-

Geological Survey scientists explore and map Antarctica. At right, a motor toboggan takes a team along the edge of the Neptune Range; below left, field camp hugs the Transantarctics; below right, a new relief map of the continent.

ANTARCTICA

ment of new techniques and devices for use in mineral exploration and research on principles of ore formation; the other is identification of geologic environments where certain ores are likely to occur, thus narrowing the field in which to use the new prospecting techniques worked out by the former.

Survey teams in the Antarctica have discovered rocks that may fill a 200-million-year gap in the geologic history of that continent. Survey engineers also are studying the movement of the Antarctica icecap. They have erected a "picket fence" across the 60-mile stretch of Marie Byrd Land and measurements taken in 4 years' time will enable them to determine the amount and direction of the ice plateau's movement.

At the same time, Geological Survey marine geologists are sampling the continental shelf of the Atlantic Coast. Information on the mineral and biologic resources of the ocean floor are being collected from the deck of the 250-ton research vessel, *Gosnold*. Part of a 25-year cooperative program with the Woods Hole Oceanographic Institution, the Atlantic Shelf Project represents a significant investigation of the submerged extension of the Atlantic States.

Survey's water research program has doubled since 1960, and 20 percent of the professional staff of the Water Resources Division is engaged in research. Projects include:

. . . Study of potential movement of pesticides, herbicides and radionuclides in streams and underground.

. . . Studies of the effect of tidal energy on the diffusion into underground fresh water sources of salty sea water—a major problem in coastal areas.

. . . Ways of dissipating heat from streams which have been used by industries for cooling purposes.

Conservation research in the Bureau of Reclamation takes two directions—one toward water, the other toward power.

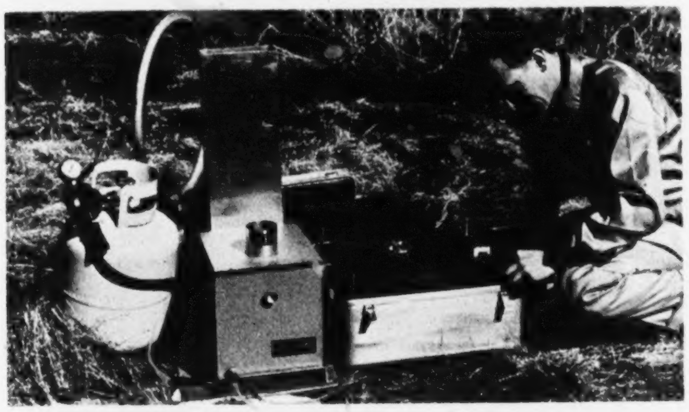
Water research is conducted in three major areas: attempts to increase water supply through weather modification; conservation of water through reduction of evaporation from large reservoirs, and a quest for materials and methods to build water projects more efficiently.

The more intensive weather research which Reclamation seeks to undertake would be based primarily on cloud-seeding experiments to increase precipitation from winter storms. These are produced when air masses moving from the ocean are forced to rise as they approach mountain ranges.

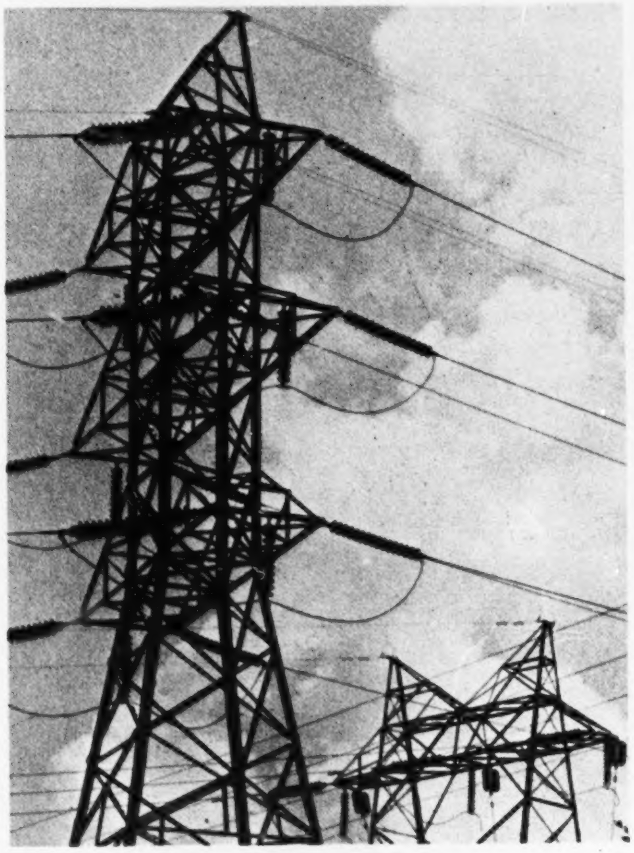
An inch of rainfall is worth more than $2.5 million when it falls in the Colorado River Basin above Glen Canyon Dam, where it produces a runoff of 575,000 acre-feet, or 187.3 billion gallons of water. Such an additional amount of water would result in an increase of $2.5 million in power revenues alone, not taking into account the benefits to agriculture, municipal

Cloud seeding attempts to increase snowfall during winter storms in semiarid land are among the projects in which Reclamation shares.

This earthquake recording system was developed by Geological Survey. It operates unattended for 10 days, "plays back" the data later.



The great "electric highways" such as these, which wheel power across our land, may be strengthened by current research.



and industrial water systems and recreation.

The proposed Colorado River Basin Program is only one facet of Reclamation's weather modification research, which has been carried on in a limited fashion in cooperation with the National Science Foundation and the U.S. Weather Bureau.

Four Reclamation field stations in the West as well as the Chief Engineer's laboratory in Denver are engaged in constant research for effective control of water-wasting weeds. An acre-foot of water means the amount of water covering 1 acre to a depth of 1 foot. Converted into gallons, it amounts to 325,850. It is estimated that in the 17 Western States, water-wasting plants infest 15 million acres and suck up and transpire into the air at least 25 million acre-feet of water every year. This is enough to irrigate about 1 million acres of cropland in the West.

To control these startling losses, Reclamation scientists have been experimenting with applications of a single- molecule film of hexadecanol or a similar chemical harmless to humans, fish, wildlife, and vegetation. A thin layer of such a substance, dispersed on water surfaces, has sharply cut the rate of evaporation. Present research is aimed chiefly at methods of applying the film, to prevent its dissipation by wind or other disturbances.

In the field of electric power, Reclamation is investigating high-speed computer techniques for correlating weather patterns with electric power system load patterns. With increasing long-distance interconnections, the surpluses which could thus be predicted might be exchanged or sold on an interarea basis.

Aluminum conductors made of various alloys are soon to be tested on three experimental transmission lines in South Dakota, for performance comparisons with conventional steel-core conductors under conditions of icing, wind velocity, vibration, and undulation. Fewer electrical outages and construction savings are the goal of this project.

Bureau of Land Management research projects include the possibilities of "geothermal" development. This involves recovery of heat energy, together with water and dissolved minerals from wells bored deep into the earth where volcanic forces have left reservoirs of trapped heat. Harnessing this energy could provide municipal and industrial heat, desalt water and generate electricity. Interior has asked for legislation to allow use of public lands for such research.

Resource research is creative conservation at its best, and the projects cited here—only a sample of what is going on throughout the Department—are not only helping to husband and wisely use our natural heritage, but are actually, in many instances, adding to our resource bank account.

Photo by William Bacon III

The future of these Eskimo children and of all Amerian Indians depends largely on the planning that is done now.

To Meet Human Needs

Humanity—Promise or problem? We must choose

In the final analysis, it is man who constitutes the most important link in the chain of life. From the human standpoint, at least, it is humanity which matters most in the overall scheme of things.

Starting with his first dim awareness of the natural world around him and following through to the highest conservation practices yet conceived, man has stood always in the center of his own universe. It was, and it still is for his own greatest good that he tampered with, bludgeoned, and finally came to terms with his environment. The key to this attitude lies in the phrase "the world around him." Only as it lies "around *him*" does it matter.

And so the question arises, what is being done in the field of conservation to assure that man—the hub of his total environment—is afforded the maximum opportunity for safety, dignity, comfort, and the stretching of muscles, mind and spirit?

Within the Department of the Interior, several specific programs aimed directly at enhancing human resources are being pursued.

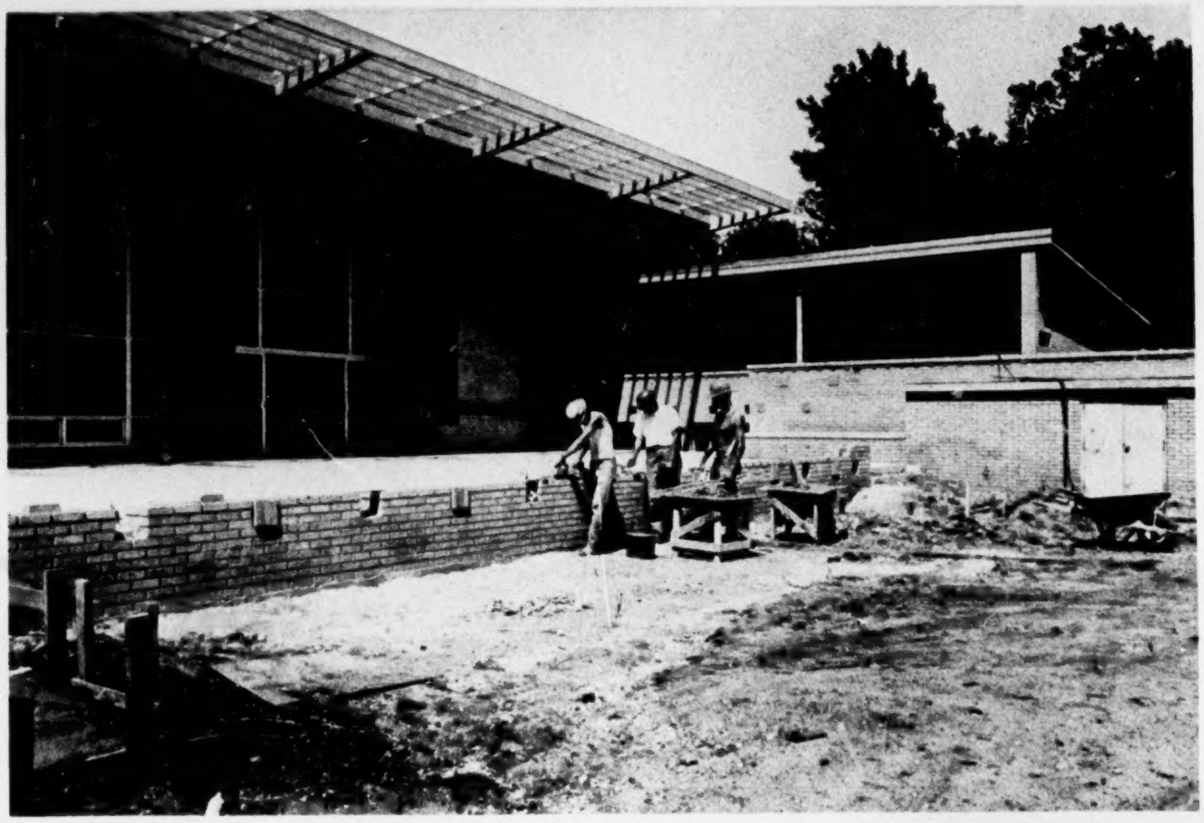
The Bureau of Mines and Geological Survey work to help make mining operations safer and more healthful, the Bureau of Indian Affairs exercises a trust administration over more than 50 million acres of Indian-owned lands peopled by 380,000 Indians; the Office of Territories is responsible for the development and welfare of the Trust Territory of the Pacific Islands, Guam, American Samoa, and until this year, the Virgin Islands. Even the Bureau of Commercial Fisheries is engaged in human resources activities involving the Aleuts residing on the Pribilof Islands of Alaska.

The two strictly people-oriented divisions of Interior are the Bureau of Indian Affairs and the office of Territories.

Reservation Indians today cling by choice to the remnants of forest and plain that once they roamed without bounds. They eke out an existence from a land-base too small to support their numbers. They cherish and maintain the unique traditions of the first American civilizations—traditions distinct for their recognition of the oneness of mankind with Nature. The soil, the water, the forests and grasslands are a part of the inner being of the Indian people. The price of abusing resources can be measured by the size of herds on the range, the color of corn in the fields, broken fences, tumbledown shanties, unsmiling children.

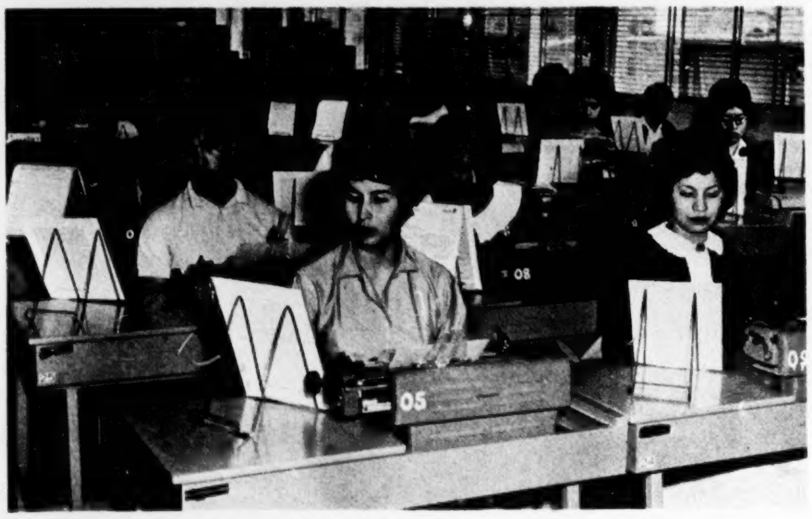
Yet the price of preserving traditions need not be poverty—although poverty is the price that reservation Indians have paid, generation after generation, for nearly a hundred years.

When the General Allotment Act was passed in 1887, Indians owned approximately 138 million acres of land scattered throughout the entire country. The Allotment Act made way for individualized holdings of small parcels. The original allottees, by 1934, had sold about half of their best



At left, Indian students build a recreation center on campus at Haskell Institute in Kansas. Below, the hunt and peck system gives way to expert typing in the commercial high school.

Education—No. 1 ally in the fight to protect our human resources



farm and grazing areas. Present estates, while containing many mineral resources in limited areas of the subsurface, are generally unattractive at ground level.

Total acreage belonging to individual Indians, as opposed to lands belonging to tribes as a whole, is now about 11 million, of which 70 percent is in heirship status. Lands once held in useful blocks are now scattered in uneconomic small units, and the heirship pattern has been a major factor in generating chronic poverty. Yet, some of the holdings once discounted as valueless desert or scrub brush are now surrounded by new population centers. Indian lands suitable for development as urban properties have a fair market value estimated at upwards of $300 million.

In addition to these individually held tracts are the 38 million acres in tribal possession. These hold virtually untapped potential for development around the natural assets in combination with the ultimate resource—the people themselves.

The beginning 1960's found nearly 50 percent of all reservation Indians jobless. Only 10 percent of the reservation housing met minimum standards. The average young adult had not advanced beyond the eighth grade of school; the high school dropout rate was well over 50 percent. The social and economic status of the American reservation Indian loomed as a growing contrast to the world around him.

The goal of the Bureau of Indian Affairs is to raise reservation Indians to a level of economic self-sufficiency, enabling them to participate fully as citizens—a status they possess by law but are often unable to exercise because of those two adversaries of human freedom—poverty and ignorance.

It takes money to reshape environments into those conducive to flowering of the human spirit. In the past 3 years, nearly a half billion dollars have been appropriated for Indian Affairs—more than had been expended during the entire preceding century and a half. But money alone is a limited asset, and the Bureau of Indian Affairs has worked to add vision and ideals.

The Bureau's staff consists of a core group in Washington, area teams, reservation superintendents, and auxiliary personnel for specialized activities such as education, welfare services, maintenance of law and order, real estate appraisal, resource conservation and development, and development of business and industry. All these services combined in an accelerated "reconstruction" effort to heal the wounds of long neglect. Personnel were mobilized as the advance guard of a national war on poverty, focusing on the Indian people in a manner that recognizes the interlocking effects of education and economic progress.

Like most government efforts aimed at social and economic problems, the war on Indian poverty had its beginnings in an officially-appointed study group. One of the first actions

At right, Indians from Salt and Gila River Reservations learn diamond cutting and polishing. Below, Navajo girls practice homemaking skills—basic to the good life.

of the Secretary of the Interior after he took office in 1961 was to appoint a Task Force on Indian Affairs.

Its report, submitted three years ago, called for firm policies to replace the long history of vacillating Federal relations with Indians. It recommended greater attention to programs of tribal and individual development as a substitute for the largely custodial responsibility traditionally exercised. The Bureau of Indian Affairs role was defined as that of working with the Indian people to raise their standard of living to a level compatible with the levels of comfort, health, education, and economic security we like to call the American way of life

The Secretary reiterated those goals at a conference of reservation superintendents convened at Santa Fe, New Mexico, in June 1964, and he called for a 10-year plan of action. Recommendations for the 10-year plan were to be submitted by October 1964, and are expected to reflect an appraisal of accomplishments during the past 4 years with a view to revamping directions wherever necessary. Meanwhile, certain developments in 1964 contain clues to the effectiveness of the present programs of the Bureau.

By 1964, efforts to expand educational opportunities for reservation Indians were concentrated in four major directions:

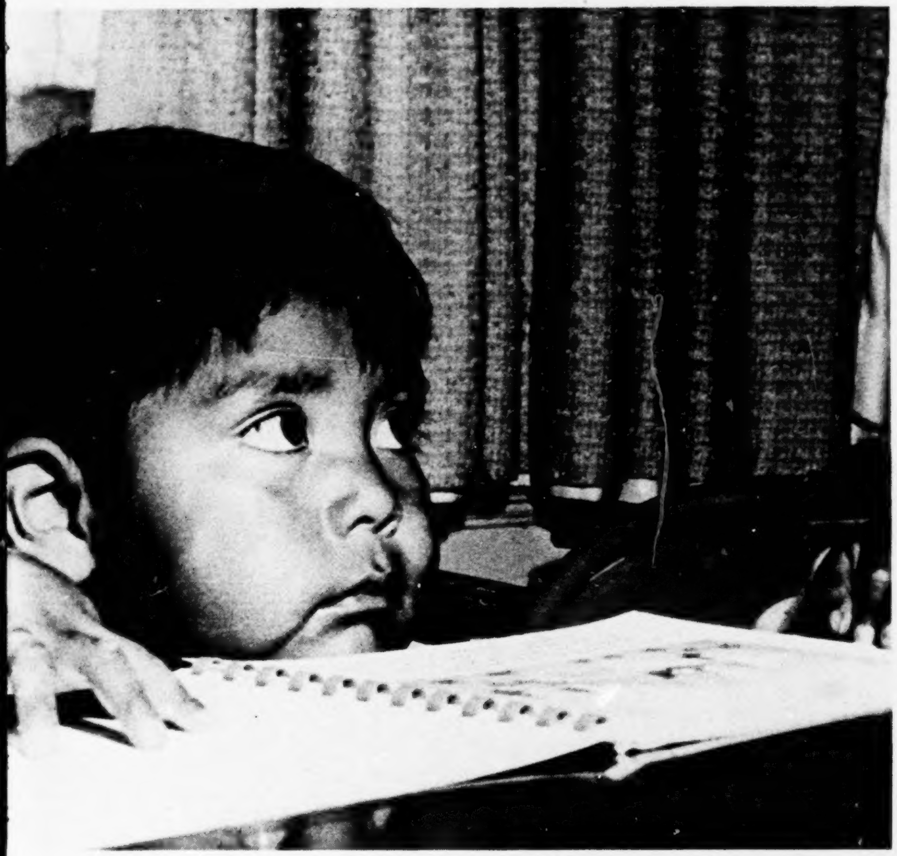
(1) *Classroom Construction:* primary target is construction of enough schools to provide accommodations for every child who has no access to public education. Construction funds spent or committed during fiscal 1964 totalled more than $33 million and 39 schools and related facilities were completed. The 263 schools in operation had an enrollment of 46, 142.

In addition, 19 dormitories were operated for 4,147 children attending public schools.

(2) *Expansion of Vocational Training and Job Placement Services for Adults:* Another big push in the long-range war on Indian poverty has been the Adult Vocational Training Program. This measure, which showed substantial gains in 1964, provides specialized counseling and guidance for any Indian living on or near a reservation and who is between the ages of 18 and 35. The program covers transporation costs, subsistence allowances, tuition and other incidentals entailed in training, as well as assistance in finding housing, costs of home furnishings, and certain health and welfare services.

The most meaningful part of this program is the job placement help that follows training. In 1964, 3,000 Indians, chiefly men, were enrolled in 295 public or private technical or vocational institutions in 23 States. An additional 500 were in training on the job under contractual arrangements of the Bureau with private industries and businesses. Placements as a result of vocational training and employment service averaged 70 percent—about 1,800 in 1964.

The 1964 outlay of $6,673,000 nearly tripled that of 1959, the year the program started. By 1967 it is expected that the Bureau's staff of 350 specialists in vocational guidance, hous-



Wonderful world of 'firsts'—That's school

Above, a Ute youngster looks earnestly and questioningly over his first book. He attends a BIA summer kindergarten. At right, Little Stinky (deodorized) has a delighted audience of students at a BIA school in Utah.

ing, community living, and employment placement will be serving some 5, 400 Indians yearly.

As a result of the vocational training and job placement program several thousand Indians have moved from their reservation into typical American communities. Between July 1, 1963 and June 30, 1964, 7,119 family members were relocated. To ease the period of adjustment, the Bureau anticipates the opening of centers to serve Indians in transition. Fiscal 1964 saw the migration of 282 Alaskan natives—Eskimos, Aleuts and Indians—into the "lower 48 States" through the Bureau's service center in Seattle, opened last year to help parents and children become acquainted with the demands of a new environment, and affectionately dubbed "Halfway House."

(3) *The War on Dropouts*: Much of the unemployment amoung Indians stems form lack of education—even in basic English. School dropouts are more numerous among Indian children than among other groups, and begin at an earlier age. Ignorance breeds ignorance, and Indian families living in remote regions have not encouraged education for their boys and girls, particularly when it entails the terrors of adjustment to unfamiliar surroundings. The memory of children going hungry in the Indian boarding schools of 50 years ago is still vivid.

Fortunately, the demands of the world of technology for skilled, educated workers now are being heeded by reservation Indians. It is becoming evident to many that education is fundamental to economic survival, and that schooling is not incompatible with the preservation of the Indian way of life. Tribal authorities, in particular, have been instrumental in stirring up interest in schools and schooling.

(4) *Beyond High School*: While the Bureau operates no colleges, in 1964 it was instrumental in obtaining a total of nearly $1.5 million in grants, loans and working scholarships. At least 40 tribal groups also provided scholarships and other funds for college education, totalling more than $800,000. State governments and private institutions contributed another $300,000.

Even more energetic were the Bureau's efforts to upgrade the quality of vocational education at the post-secondary level in its Indian schools. Remedies for Indian unemployment include emphasis on post-secondary technical training, creation of a "master teacher" category, and teacher training programs.

Education is approached as a lifelong process. Summer programs of remedial teaching, occupational training, and group recreation, begun modestly 2 years ago, drew an enrollment of about 20,500 in 1964, from preschoolers to young adults. Beyond the summer schools, a parallel reawakening of adult education and recreation programs, resulted in an enrollment of 31,000 adults in 183 Indian communities.

"Maximum economic self-sufficiency" for Indians was one

(Top left) The comforts of home and good fishing, too, are the happy lot of these anglers at the Zuni Reservation in New Mexico.

(Top right) Indians are building outdoor fireplaces on Sisselton Reservation as an inducement to encourage tourism.

(Left) A graduate of the farm training program, conducted by the BIA Branch of Land Operations, surveys his spread.

of three goals set down by the Task Force on Indian Affairs. The other two are "full participation in American life" and "equal citizenship privileges and responsibilities." All are interdependent upon one another for attainment.

Three years ago the Bureau organized a Division of Economic Development. Its four targets have been: (a) Improvement of natural resources through intensive irrigation and conservation efforts; (b) encouragement of business and industrial development by creating an environment for investment; (c) technical assistance to the tribes to promote an appreciation of the importance of land management; and (d) a program of home building and public works construction (with the aid of other Federal agencies) as a visible means of relating the good things of the modern world to life on the reservation.

As these directions took form and substance, it became apparent that one area in which the appeal was strong and natural among the Indian people was the development of natural resources for recreation.

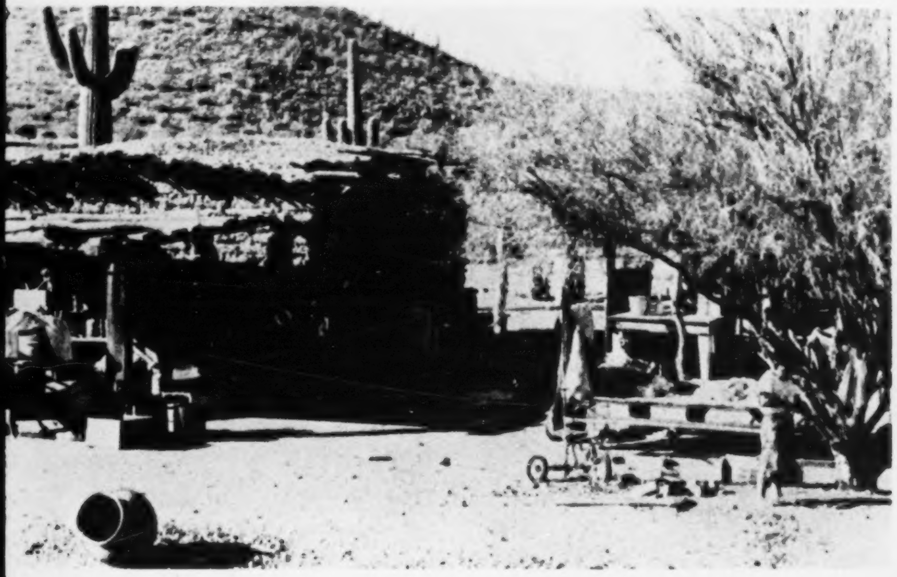
Some Indian lands offer a potential for tourist recreation equalling that found anywhere in the country. Thus the goal of Indian land improvement became coupled with the goal of increased Indian employment and increased acceptance of personal responsibility.

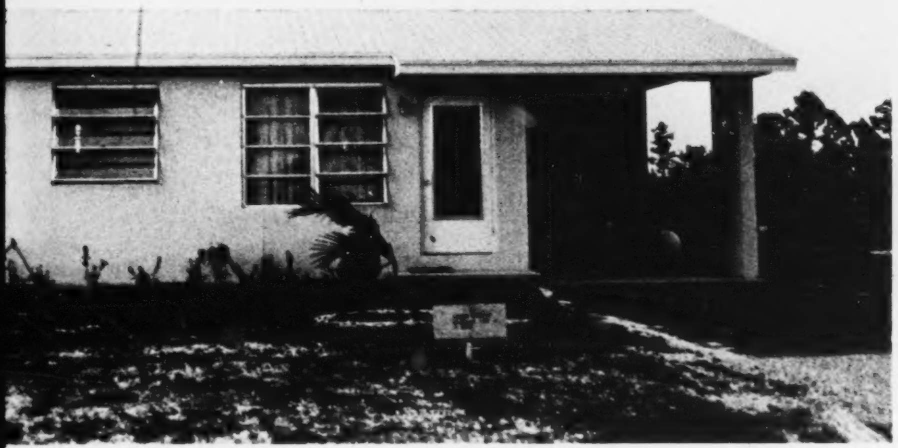
What else is being done to put those lands to use for the social and economic betterment of the Indians who own them? The directions are many:

Recreation Development: Studies of recreation potential have produced some exciting plans. A ski facility and hotel complex, with an investment of $1.5 million in Bureau loans and tribal and private funds, is in the planning stage for the Mescalero Reservation in New Mexico. A resort complex has opened at Kahneeta Hot Springs on the Warm Springs Reservation in Oregon. The Big Horn Canyon National Area in Montana offers promise of further recreation development. Additional studies also are focusing on industrial and recreational development possibilities on more than a dozen other reservations.

Employment through Resource Development: Bureau programs to improve livestock grazing and agricultural resources are presently providing hundreds of jobs. In 1964, the first major construction was begun on irrigation of more than 110,000 acres of Navajo land. An irrigation project on Arizona's Colorado River Reservation, authorized a century ago and still only one-third completed last year, has moved rapidly during 1964, brightening prospects for the reservation's future. Completed during 1964 were term development leases up to 25 years on nearly 11,000 acres of new land following the Supreme Court's settlement of the dispute over the division of water from the Colorado River.

Altogether, more than 36,000 acres of Indian land were





Dwelling at upper left is still "home" to a Papago family; the one below was built by Indians at a "house-raising bee." Above, Indian forest lumber goes from boards to bungalows.

reclaimed for agriculture through improved irrigation systems. Farm-to-market service roads are needed for successful farming, and a substantial part of the road construction program is devoted to this purpose.

Accelerated Public Works Program: An immediate attack on Indian unemployment was launched late in 1962 under the Accelerated Public Works Program, the overall administration of which is under the Department of Commerce.

More than $21 million has been spent or obligated on reservations since inception of the program, creating temporary employment at an average level of more than 3,000 Indian workers. The projects ranging from construction of roads and community centers to forest and range improvement, have benefited nearly 90 reservations in 21 States.

Industrial Development: In the past few years the Bureau has negotiated the establishment of 40 small manufacturing plants on or near reservations. The Bureau's Division of Economic Development has operated in close liaison with the Area Redevelopment Administration, assisting more than 40 tribes to prepare ARA-approved Overall Economic Development Plans and thus to qualify for ARA loans, grants and other job-promoting services.

Federal Loans: The Bureau's credit program has assisted individuals to go to school, start small businesses, improve their homes, and buy livestock. Tribes have been helped to build and operate motels, develop and improve tribal herds, build and operate canneries and saw mills, and engage in many other forms of enterprise. The Bureau's loan program operates through a revolving credit fund.

Although nearly $150 million is currently being used from combined Federal, tribal and private sources, much more is needed if economic development is to keep pace with the times. The Bureau is looking toward a new program—loan guaranty and insurance authority—legislation for which is now pending in Congress. Two separate authorizations to increase the revolving fund for loans also are pending.

Housing: After many years of neglect and inattention, progress is at last being made in the field of Indian housing. In 1962, in cooperation with the Public Housing Administration, the Bureau brought low-rent housing to the Indian reservations for the first time. The aggregate value of low-rent and mutual-help housing projects currently reserved by the Public Housing Administration for the reservations will result in more than 3,300 new housing units.

The "mutual-help" phase of the program, was devised to assist Indians who cannot afford to pay even for low-rent housing. The Indian acquires an equity in his new home by contributing his own labor, in cooperation with his neighbors, to construction. The tribe provides the land. The Public Housing Administration provides funds for materials and for some supervisory skilled labor. The Bureau provides necessary organization and overall supervision.

A new desire to help themselves shows in Indian life and art

ARTS & CRAFTS

At the Institute of American Indian Arts in Sante Fe, new Indian artforms reflect a renaissance of Indian spirit.

For families so poverty-ridden they could not even participate in the mutual-help housing program, the Bureau experimented with a small program to provide home improvements. However, in many cases the existing housing was so dilapidated that new construction was essential. Because of limited funds, this program has been confined to four reservations in the north, where climate is most severe and human suffering most apparent.

Fiscal, Administrative and Technical Assistance: A main task of Bureau personnel during the last 3 years has been to provide technical assistance to tribal authorities that will assure Indians wise use of moneys deriving from land claims settlements, royalties on mineral leases, and tribal enterprises. Tribal plans for spending such funds are subject to approval by the Secretary of the Interior. While many of these settlement sums have, in the past, been parceled out to tribal members, the trend is growing toward provision for education funds, resource development, business enterprises, and emergency funds.

Real estate appraisal services also have been extended to Indian land holders during the past 3 years, with the result that rental income from Indian owned land has increased by $4.5 million.

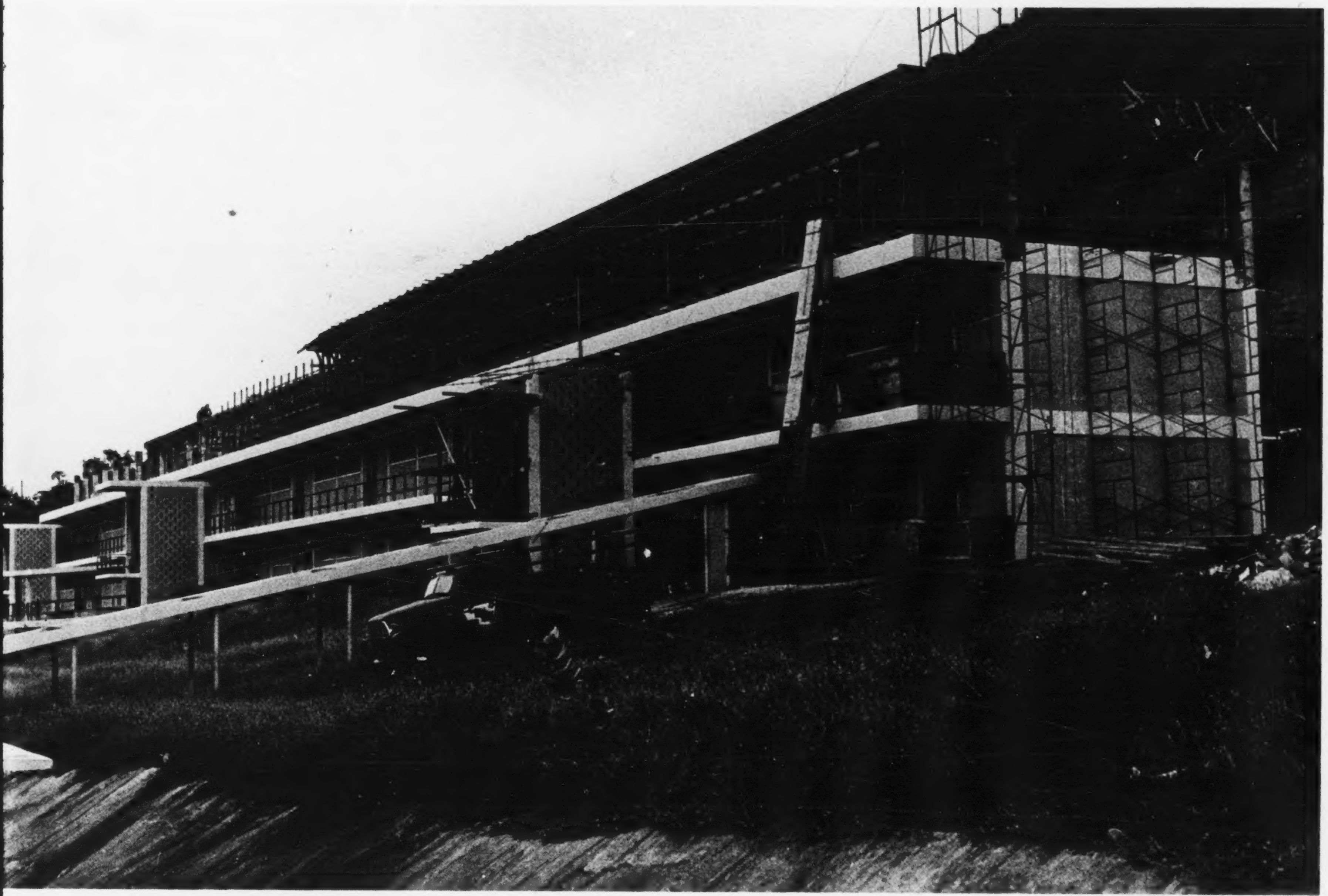
Other long-standing services provided by the Bureau include counseling, financial relief, and special aids for neglected children—such services often rendered in cooperation with State, local, and private agencies—and assistance to tribes in law and order responsibilities.

The Indian Arts and Crafts Board reported that an estimated 8,650 Indian and Eskimo craftspeople earned a net income of $2 million producing and selling craft products. The majority are women who earn a supplemental income producing crafts.

The Indian Arts and Crafts Board serves the Indian and Eskimo craftspeople and the general public as an information, promotional and advisory clearing house for all matters pertaining to development of authentic Indian and Eskimo arts and crafts.

The goal has been one of community action at many levels on the part of the Indian tribal people.

Step by step, little by little, the fabric of American society is being woven into the patterns of reservation life. Tribal governments are functioning more actively and with a new awareness of the importance of sound fiscal and administrative policies. Activity is supplanting indifference. The trend shows in the growing number of applicants for college scholarships, in the backlog of adults seeking vocational training, in the highly organized and active Indian interest groups that are making their voices heard throughout the country, in the intertribal cooperation that is emerging, in the welcome signs for tourists and the paved roads that becken them.



This addition to the Charlotte Amalie High School in St. Thomas, Virgin Islands, created an added 10 classrooms

The American Indian is emerging as a whole man in our world, bringing with him the gifts of a cultural heritage and a set of values that can do nothing but strengthen the fiber of the American society.

Signal progress in bringing America's overseas territories into the 20th century without impairing their distinct individuality has marked the Office of Territories activity since 1961.

The people of the Virgin Islands, Guam, American Samoa and the Trust Territory of the Pacific have benefited from historic strides in education, health, housing and economic opportunity.

The Johnson Administration has asked Congress for legislation to provide for popular election of the Governors of the Virgin Islands and Guam—a further step toward self-government for those two territories.

Virgin Islanders have completed the first stage of a far-reaching program of social, economic and cultural development. New housing projects are going up all over the territory and decent housing and community facilities are replacing what were once eyesores in the Islands. Where once there were 80 pupils to a classroom, in schools out of date and poorly maintained, the Virgin Islands now averages only 30 to 35 pupils per classroom and children are being taught by a revitalized faculty of veteran and new teachers, dedicated in their resolve to move ahead. Two high schools have recently been accredited and now qualified graduates can go on to colleges of their choice, or they can continue their education in the new College of the Virgin Islands which opened its doors in July 1963.

Roads are being built, piers constructed, and water and sewer systems extended. Major additions have been made to existing hospitals and new facilities are being designed. Medical staffs have been enlarged. A phenomenal 41 percent gain in the number of tourists in fiscal 1964 over the previous year helped fill three new hotels. Two new banks were chartered, to make four for the Islands. Airport improvement brought St. Croix regularly scheduled jet service.

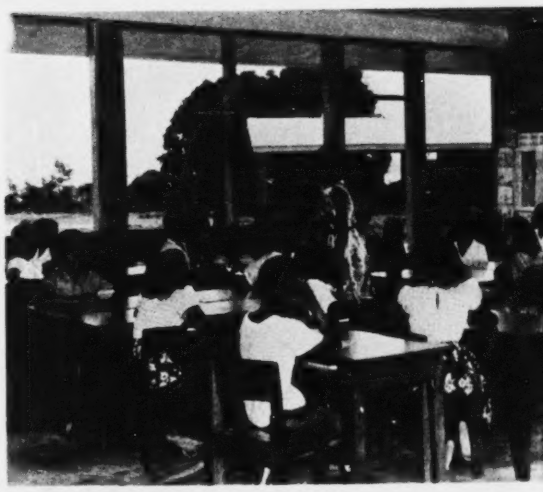
The Virgin Islands are meeting the challenge of a changing society and moving ahead with confidence toward social and economic prosperity.

Every activity in the territory of Guam, the westernmost point of United States soil in the Pacific, is being keyed to recovery efforts to erase the scars of Typhoon Karen which devastated the island in late 1962, destroying or damaging 90 percent of the island s buildings. The people of Guam have tackled the formidable rebuilding task with courage and determination. The Guam Rehabilitation Bill, signed into law late in 1963, will provide $45 million in loans and grants to Guam for this massive rehabilitation program.

Two decades of westernization and accelerated reconstruction in every field have altered Guam from the sleepy village it resembled in prewar days. A tax incentive program to attract business is under study by the Legislature and plans to

And then the schoolboy

Education has top priority throughout U.S. overseas territories. New schools like the Micronesian one at right, are bringing the 20th century to the Pacific while retaining native culture. School complex (above) is one of 26 units for T.V. education.



with shining morning face

boost the tourist trade include the construction of a hotel and other facilities. A Polaris submarine base will increase the population of the community by several hundred families.

The current building boom is a tribute to the faith and optimism with which residents of the island view the future.

The small specks of land that comprise American Samoa and the Trust Territory of the Pacific Islands for many years were islands which resisted the flood of human advancement. Perhaps nowhere else under Interior's jurisdiction has the step forward into today's world been as dramatic or as significant. Whether the project be a school, a health center, a road or a dock, it has had major importance in terms of people's involvement in their own future and the achievement of a life of dignity and opportunity.

The people of the Trust Territory of the Pacific Islands, which is administered by the United States for the United Nations, were on an annual budget of less than $7.5 million until 1962, when the Administration raised the appropriation ceiling to $17.5 million. Immediately, a massive effort to upgrade education and health services was initiated together with new programs of economic and political development.

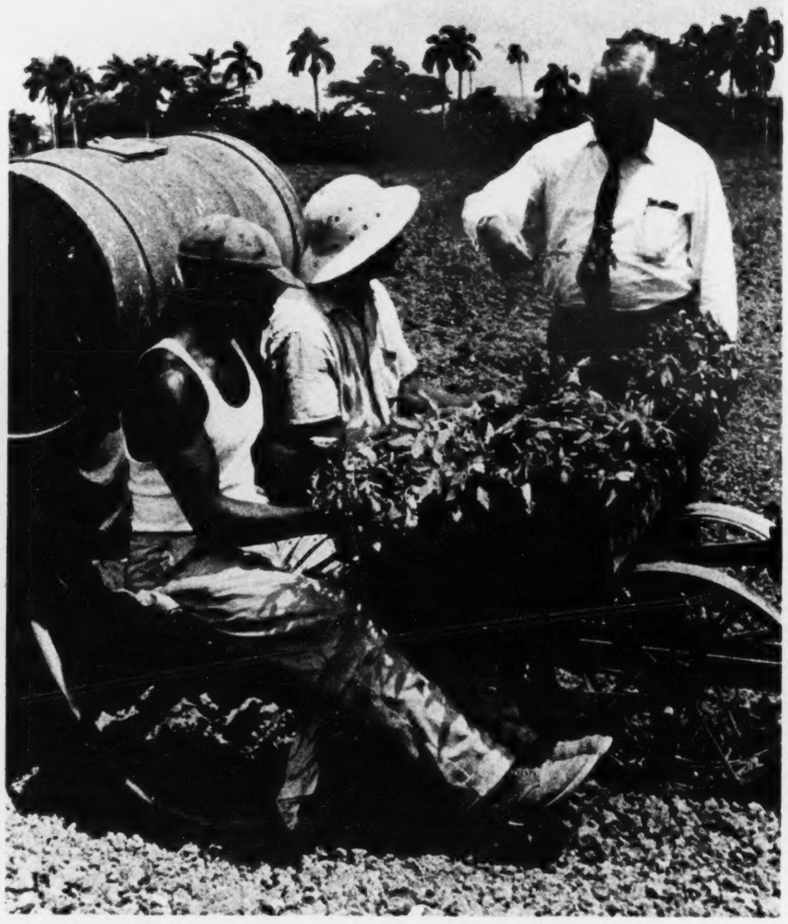
The children of the Trust Territory are being equipped to live in the modern world through an improved education program which has seen more than 150 American teachers newly recruited and Micronesian teachers given urgently needed additional training. More than 500 new elementary classrooms will be completed by 1966. Government scholarships have been awarded to more than 100 Trust Territory students to attend college in Hawaii, the Philippines and the United States mainland on government scholarships and an additional 100 are enrolled at the College of Guam.

Health services to the islanders have been tripled and a comprehensive immunization program has been initiated. Eight doctors recruited from the United States are supplementing Micronesian medical personnel and giving them continuing training. Twenty-two Micronesians are studying medicine on government scholarships. The $2 million medical budget does not include three hospitals built during the past 3 years and the three additional hospitals being planned.

Micronesians play increasingly important roles in the government of the Trust Territory and in three of the six districts, they have replaced Americans as assistant district administrators. The Council of Micronesia, elected from the various districts, has developed plans for a legislative body for the territory. Enhanced economic opportunities are being provided Micronesians through programs of crop diversification and the establishment of such operations as a tuna freezing plant installed in Palau by a major American firm.

In 1961 the new Governor of American Samoa obtained a doubled budget for territorial rehabilitation and within the

Expansion of Federal housing programs to the territories has made modern homes for former shack dwellers.



Help in making their farm lands produce (above) and in developing industrial skills like boat building is being extended to the territories.

first year three new high school buildings were completed. Small, scattered village grade schools are being consolidated and an educational television system is being completed as a primary teaching tool for the entire area.

Using highly qualified teachers, the system will operate on three channels, later to be expanded to six as need develops. Adult education is included in the programming.

More than 100 United States teachers have been brought into the classrooms to remedy the shortage of well-trained local teachers; a jet airport has brought regular jet airline service to the islands; new modern generators provide dependable electric power; new water and sewer systems are planned, and a modern telephone exchange has been installed; major villages of the main island of Tutuila now are joined by a new paved highway, and secondary roads link the smaller villages; the Samoan Development Corporation is building a 100-room luxury hotel to attract tourists; and the Samoan Legislature has enacted a complete overhaul of the islands' tax structure, providing an income tax, revised customs and other reforms.

In terms of overall care, the only other group of people for whom Interior is responsible is the Pribilof Island Aleuts. Under the treaty terms of the 1867 purchase of Alaska from Russia, the Bureau of Commercial Fisheries and the Fish and Wildlife Service assumed a special responsibility for the inhabitants of the two villages on the islands of St. Paul and St. George—descendants of workers transplanted from their Aleutian Islands homes 2 centuries ago by the Russians.

Isolated by the stormy Bering Sea and completely dependent on the Government-controlled fur seal operations, the islanders have been peculiarly handicapped in their efforts to rise from a primitive heritage to a fuller share in the American way of life.

Until recently, government management had been entirely paternalistic. Beginning in 1960, an intensive effort has been made to help the native residents lead independent lives as full citizens. The goal has been to improve health, education and housing and eventually to restrict governmental concern primarily to the northern fur seal resource.

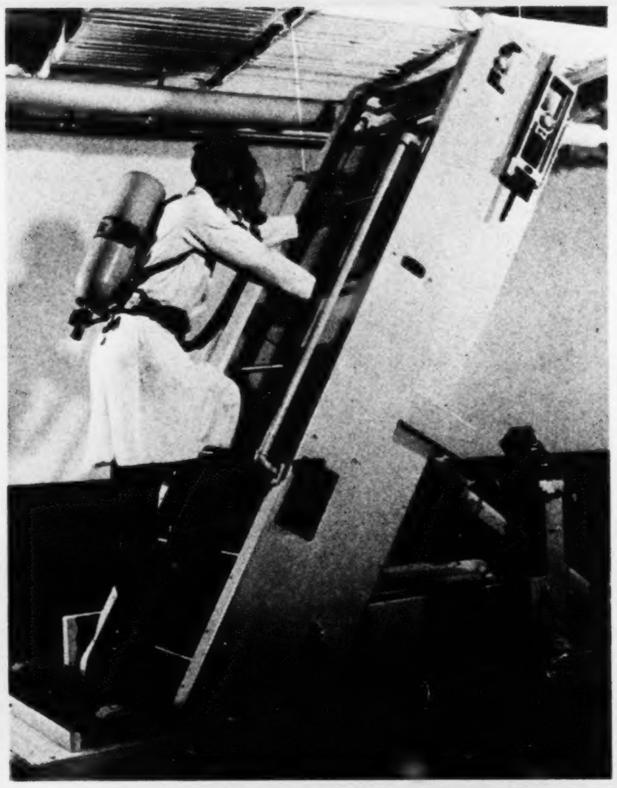
A new Aleut Pay Plan which recognizes skill and productivity, a broadening of the St. Paul Island economic base to make it capable of supporting the St. George Island population which ultimately will be transplanted to St. Paul, a new by-products industry to convert waste seal carcasses into mink feed and encouragement of private business enterprises such as the native-owned canteen are all part of this push toward self-sufficiency.

Trapping of blue foxes is permitted and the domestic reindeer herd is becoming an important source of fresh meat.

Education has suddenly become popular with both children and adults and the Bureau of Commercial Fisheries has stimulated this trend by improving the two island schools. A foster

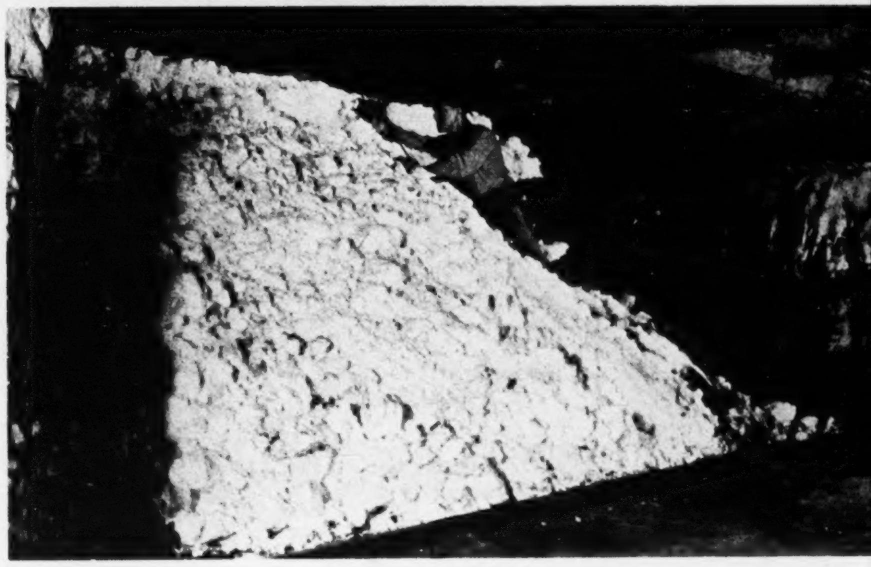
Stewardship includes a search for safety

(Right) Bureau of Mines performance tests like this help assure proper functioning of this apparatus for men who are entering dangerous mine atmospheres.



(Above) Grand Teton National Park rangers train for saving human lives by mountain rescue work.

(Right) This piped foam method of fighting fires affords remote control, eliminates personal peril.



home program will allow more gifted students to enroll in mainland schools.

Increasing air service has stepped up the number of visitors, affording the Aleuts valuable contact with mainland people and customs. Community councils are giving the Aleuts their first experience in managing their own community problems.

In addition to its "primarily people" programs, Interior is very much involved in a number of activities which involve human health, safety and welfare. These activities range from special task forces appointed by the Secretary and representing a Departmentwide effort to the more limited projects within the individual Bureaus.

In the former category are two mine safety studies and the water safety movement. As a result of one 2-year study, undertaken by the Secretary at the direction of Congress, a proposed Federal Metal and Nonmetallic Mine Safety Act was being drafted by the Department. This Act would embody the Secretary's recommendations: Establishment of advisory committees composed of labor and management to develop health and safety codes, institution of formal health and safety inspections followed by formal reports, and provision for accurate and timely employment and injury reports.

It was the first Federal study ever to include other types of mines than coal.

In May 1963, following 2 coal mine disasters that took 59 lives, Secretary Udall ordered an intensive review of existing Federal coal mine safety laws and actual mining practices. He appointed top Departmental officials to a special task force to conduct the review and recommend remedial measures. Less than 3 months later, on the basis of the task force report, the Secretary proposed major extension and revision of the Federal Coal Mine Safety Act of 1952—an action considered necessary to reduce the human costs of coal production.

Also at the Secretarial level was the accident prevention movement, launched in June 1964, to emphasize water safety on the 22,000 miles of canals, streams, rivers, and lakeshores and nearly 7 million acres of water supervised by the Department. Secretary Udall noted that a special task force study showed that better public cooperation and understanding were needed to keep water accidents at an absolute minimum.

Within the bureaus the effort to preserve or improve the human condition is a day-to-day part of the overall operation. Bureau of Mines accident-prevention courses for mineral-industry employees rose by a remarkable 40 percent in fiscal 1964. First aid and mine rescue training, films on safety, and demonstrations of fire, explosion and mine-gas hazards were attended by 170,000 workers.

Research aimed at promoting the health and safety of miners has shown marked advances. Among them is the method for fighting underground coal fires from the surface, worked out by the Bureau in fiscal 1964. It involves sealing off the fire zone with mineral wool, inserted through boreholes from the

The fearful toll of human fortunes and futures from heedless mining practices can be seen in this street of sunken houses, buckled sidewalks and burst mains caused by land subsidence.

surface and it succeeded when applied in a large West Virginia coal mine fire. Sealing off fire in a gassy mine—considered one of the most hazardous undertakings in an inherently dangerous industry—was accomplished without risking the life of a single man.

Those who mine the vast tonnages of coal this Nation requires are not the only ones whose fortunes and futures are at times jeopardized by the essential and difficult work they do. The toll sometimes is exacted from the people who only reside in coal-producing areas. Occasionally it takes bizarre forms.

In parts of eastern Pennsylvania's anthracite or "hard coal" region, one may pass through towns where sidewalks have buckled, houses lean wearily against one another or tilt crazily forward. Weakened by underground voids created when miners years ago claimed their prize of coal, the earth has sagged. Elsewhere, a smoky haze drifting lazily above a smouldering pile of mine refuse, dimming sky and countryside that should sparkle. Or, not far from the heart of a busy city, wisps of smoke on a mountain testify to where coal should not be burning, but *is*—deep underground.

The anthracite industry has been ailing for many years and its struggle back to health will take time. The industry has been working with local, State and Federal governments to remove wherever possible the most serious threats posed by subsiding earth and abandoned underground mine fires. In two Pennsylvania cities the gradual sinking of ground over mined-out areas is being combatted by injection into the voids of crushed mine refuse. The twin salutary effect is to rid the landscape of unsafe, unsightly mine refuse heaps and of shoring up the sagging surface areas.

The raw, scraped ugliness of unreclaimed strip-mined land involves some serious long term social costs. The Department has given strong support to proposed legislation authorizing a study of all types of domestic surface mining operations as a first step toward dealing with the problem.

Meanwhile, the Bureau of Mines found that the unsightly, unsafe "highwalls" left by strip-mining can be reshaped into gently sloping surfaces by means of explosives.

Manifestations of earlier and less prudent mining days, especially as they afflict a few large urban centers, cannot be ignored. They add to the woes of Americans already burdened by the depressed condition of an industry that once knew far brighter times.

In further efforts to combat poverty and improve the quality of American life the Department has taken full advantage of

The stream bed above is dry because its water has seeped through to enter active anthracite workings below. In the picture below, water that once threatened mine workers now is safely contained in this concrete drainage ditch, constructed under a State-Federal mine drainage program.

Photo by U.S. Department of Agriculture

The Civilian Conservation Corps coupled experimentation with know-how in 1933. Today the Job Corps adopts the plan to problems of the '60s.

the Accelerated Public Works Program, worked closely with the President's Appalachian Regional Commission and planned intensively toward the opening of the first Job Conservation Corps camps.

A special task force on physical resources analyzed the needs and opportunities in Appalachia as they related to Department of Interior programs, then submitted action recommendations which helped shape the Commission's proposals to Congress.

The Department's Resources Program Staff coordinated planning for the Job Conservation Corps, which may give a new start in life to 10, 000 young men now out of school and out of work. Five bureaus participated in the planning.

As conservation becomes more and more a worldwide movement, Interior's international activities have expanded accordingly. The Department's efforts centered in three principal categories: (1) Support for the Agency for International Development in its natural resource development programs; (2) tariffs and trade with particular reference to fishery and mineral products; (3) activities of international organizations, principally the U.N. and its affiliated groups.

A participating Agency Service Agreement with AID will mobilize Departmental specialists to support the Alliance for Progress program for rural development in Latin America. Surveys in Tanganyika, Uganda and Kenya will explore development possibilities based on the existing East African wildlife-national park structure.

The Undersecretary participated in the Cabinet-level Joint United States-Japan Committee on Trade and Economic Affairs in Tokyo in January 1964; the Secretary took part in the meeting of the similar United States-Canada Committee in Ottawa in April 1964; and the Assistant Secretary for Mineral Resources attended a meeting of the United States-Canadian group in Washington in September 1963.

Geology and hydrology work is going on vigorously in more than a dozen countries under cooperative agreements with the Geological Survey and the Bureau of Reclamation. Several hundred technicians, professional personnel and officials from foreign countries participated in on-the-job training in this country.

Whether it means lending a guiding hand to people who are the Department's direct responsibility, or joining hands with people outside the Department or even outside the United States to bolster an economy or manage a resource, Departmental action is based on the fundamental that people are the most precious resource.

Keeping The House In Order

Economy, efficiency— These are the words from the White House

To keep order and efficiency paramount in an agency which represents such a wide range of activities is no easy matter. It is the responsibility of Departmental Management to supervise and occasionally to revise the working mechanics of Interior—to leave each of the approximately 70, 000 employees free to produce at his highest level.

The position of Administrative Assistant Secretary is charged with responsibility for exercising "the authority of the Secretary with respect to all matters in the field of administrative management."

This responsibility covers all phases of budget and finance, investigations and compliance, research, personnel and property management, procurement, audit, security, management operations and automatic data processing.

New programs were begun in fiscal 1964 all designed to further the Department's efforts to conserve funds, to provide for the maximum utilization of personnel and to increase the effectiveness of its operations. Emphasis has been given to cost reduction projects designed to achieve savings, either in funds or personnel, including the critical examination of existing organization structures; functional and organizational consolidation; simplification of program and administrative processes; examination of interagency relations, internal and external, to eliminate duplication and overlap; and use of new techniques leading to productivity measurement and performance standards.

The continuing business of keeping pace with the framework

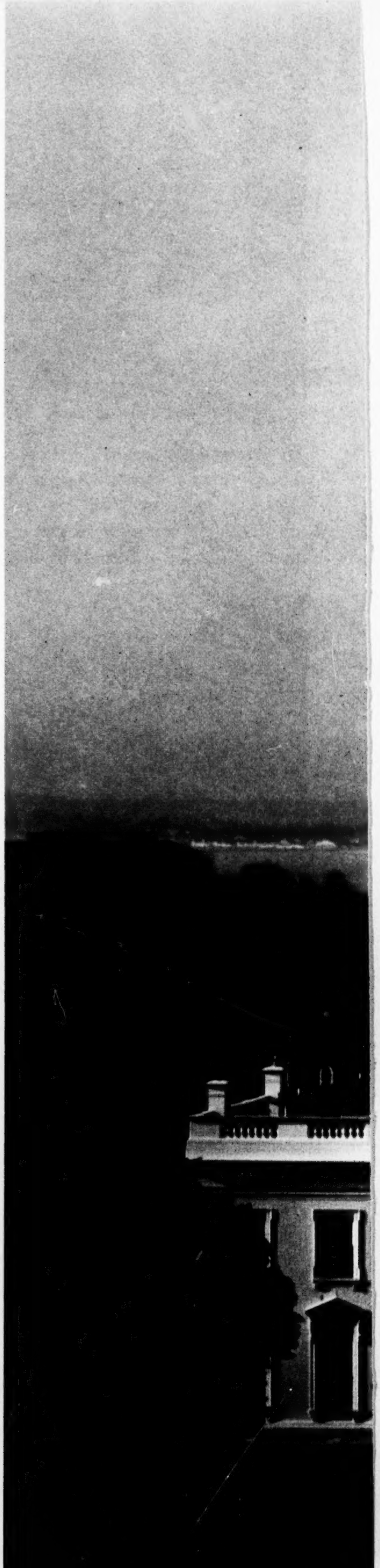
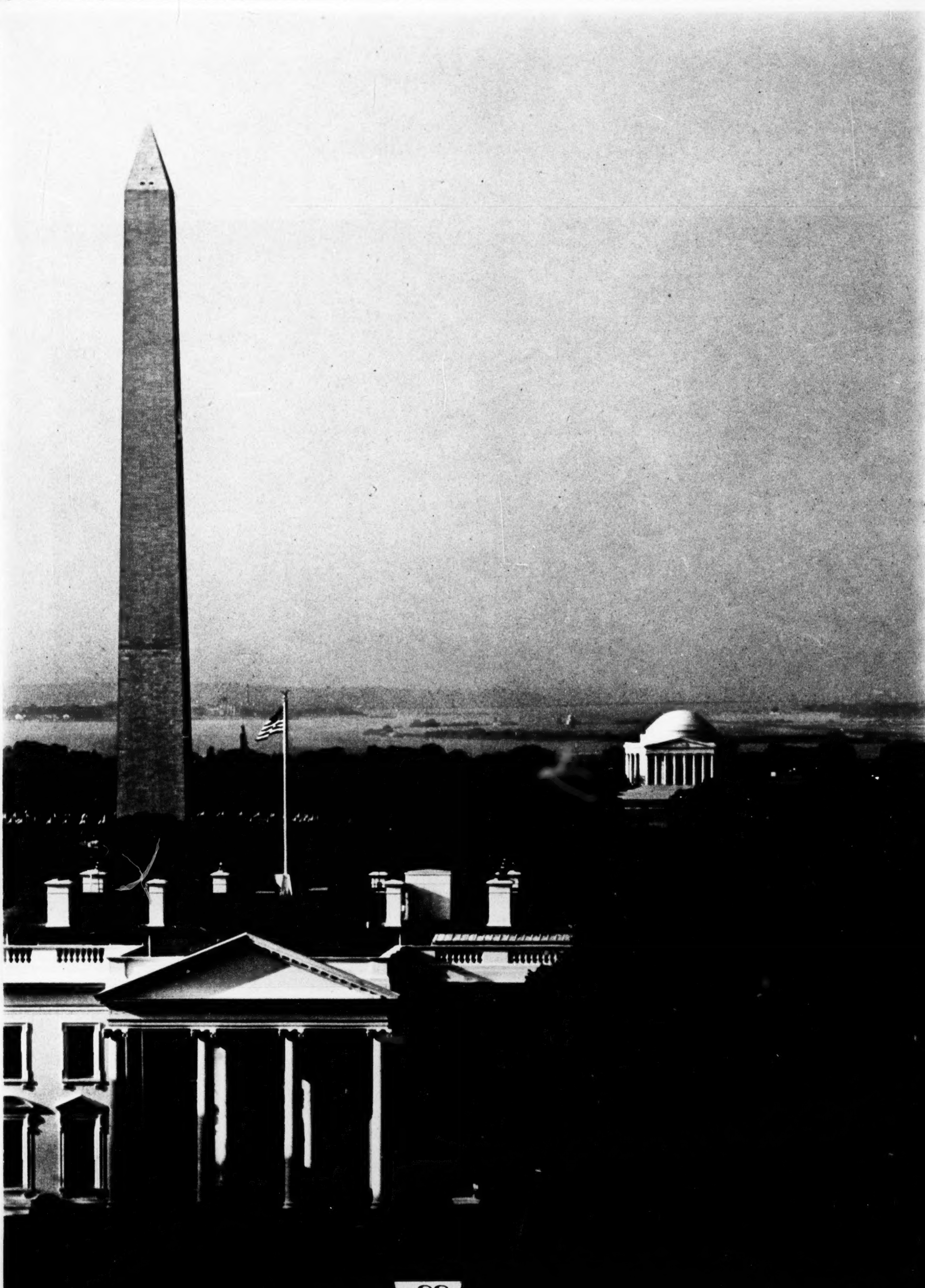
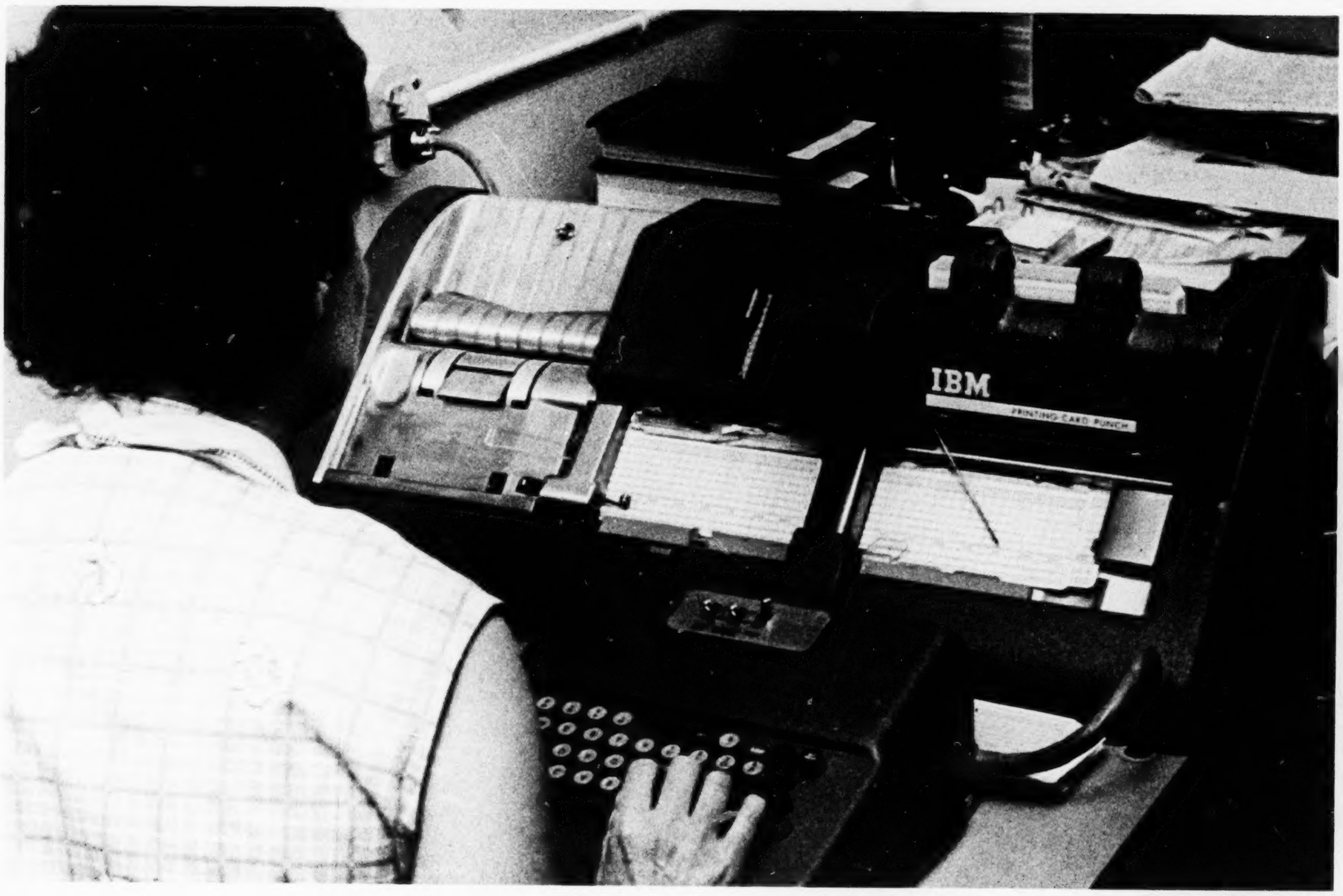


Photo by Abbie Rowe





of conservation progress was abetted in fiscal 1964 by coordination of Departmental programs in the field. The coordination became nationwide with the establishment of two new field committees in the Southeast and North Central regions and the appointment of three new regional coordinators with headquarters at Minneapolis, Cincinnati, and Atlanta.

The North Central field committee is divided into the Upper Mississippi-Western Great Lakes and the Ohio River-Appalachian subareas, each with regional coordinators who jointly chair the field committee.

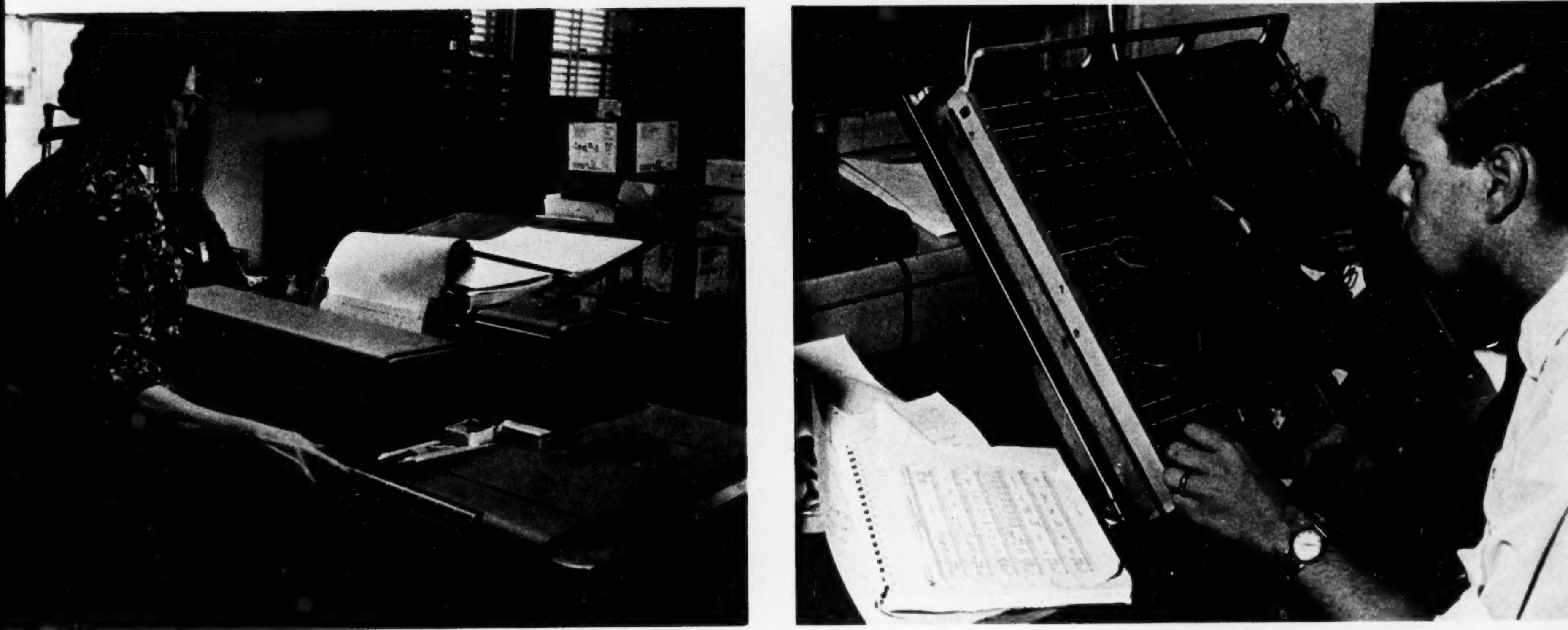
New and more precise policies in the development of automatic data processing, based upon Government-wide studies by such agencies as the General Accounting Office and the Bureau of the Budget, placed primary emphasis upon interbureau use of common computer facilities. These joint-use arrangements have been made an integral part of the Department's ADP program.

Contract procurement processes were strengthened by more incisive review procedures, critical surveys, advisory services, and actual contract review.

Internal audit in the Department shifted in emphasis to a functional approach. This was directly related to major goals of improved manpower utilization and fund economy. The Financial Management Improvement Program underwent similar changes. Fundamental to this effort is modernization of the ways of doing business, using computer technology and other technical aids.

In the Department of the Interior, equal opportunity in employment extends beyond mere regulatory compliance. Sharp increases in minority employment were reflected in 1963–64 in the upper grade and salary levels. The college recruitment effort, with emphasis upon qualified Negro career prospects was dramatized by then Vice President Johnson when in the fall of 1963, he keynoted a conference of Interior management officials in support of the Department's equal opportunity activities. Employment of Negroes in the Department has increased more than 20 percent over the past 3 years.

The program to increase the employment of minority races by Government contractors was fortified by an October 1963 seminar of contracting officers in Washington and by periodic



The machines and equipment shown here represent a great leap forward in streamlining the work of the Department and at the same time trimming the number of employees necessary to the various and vital works described on prior pages.

meetings with members of the staff of the President's Committee on Equal Employment Opportunity.

Collective bargaining with blue-collar worker unions has long been an important element of Departmental management. The Department's code of labor relations successful for years in the determination of policies and conditions of employment is now being extended to associations of professional, technical, clerical, and other white collar workers as part of the general strengthening of employee-management cooperation in the public interest.

As part of a continuing review and appraisal of bureau and office organization and management, a number of organization improvement studies were conducted during 1964. They included the expanded Office of Saline Water, its management practices, staffing priorities, and organization in general; the Office of the Solicitor and its appraisal of attorney performance and legal information retrieval and research methods, and other elements of its management; and the organization of the Bureau of Mines safety program.

The activities of the Office of the Administrative Assistant Secretary in the field of management systems for scientific research also had a number of notable results during the past fiscal year: (1) development of a management data system for summarizing and analyzing the Department's scientific research program; (2) standardizing the Department's procedures for reporting current research to the Science Information Exchange of the Smithsonian Institution; (3) financing research papers published in non-Governmental scientific journals; and (4) undertaking of science information and data retrieval projects.

The Department Library during 1964 launched a program to increase the effectiveness of the Department's information and communication network in the field of resource research. A researcher needs to be currently informed about research in progress and the latest literature in his specialty, needs to be provided bibliographic data in the initiation of new research projects, and needs authoritative answers to specific reference queries. The Library program includes the development of automation as a means for expediting the delivery of research data and materials to Departmental research laboratories and other locations of bureau and office engineers and scientists.

The role of an Assistant Secretary and his staff is primarily that of taking leadership in the planning for new, controversial, or many-sided programs which may extend beyond the bounds of a single Bureau or Office. The imprint of the Administration, the recognition of political aspects, and the need to consider balance between programs in various areas of the Department, are best obtained at the Secretarial level.

The Science Advisor to the Secretary is charged with consultation, advice and coordination of the Department's program of research. He has represented the Department on the Federal Council for Science and Technology (studies in oceanography, atmospheric sciences, water resources), the Office of Science and Technology (an interagency energy-study commission), study teams or task forces probing large-scale nuclear power plants for distillation of sea water and production of electric power, the design of the National Aquarium and Fisheries Center in Washington, D.C., pesticides and their application, and overall supervision and review of work in the field of water research—from acid mine drainage and desalination to questions of total water supply and management.

Participation of the Office of the Solicitor in the Department's quest for quality is reflected not alone in legislative achievements. It finds expression in the accomplishments of many of the Interior programs. Decisions rendered by this Office have played important parts in paving the way for or following up on such actions as the Pacific Northwest-Pacific Southwest Interie, the Columbia River Treaty, the transfer of the San Diego sea water conversion plant to the Department of the Navy at Guantanamo, solution of oil shale claims, and development of the Pacific Southwest Water Plan.

The Secretary of the Interior has responsibility under Public Law, conjointly with the Interdepartmental Board on Geographic Names, for providing standardized geographic names required on maps and in other publications of the Federal government. The office of Geography conducts geographic and linguistic research investigations, prepares and maintains name files, and performs other staff functions relating to the standardization of names of all foreign areas, the oceans, and Antarctica. The Geological Survey performs similar functions in the field of domestic nomenclature. Advisory Committees on Antarctic Names, Arabic and Persian, and Undersea Features assist the Board and the Secretary in providing the required standard nomenclature in their areas of special competence.

The Board on Geographic Names was established as a central authority to standardize geographic names for Federal use and to eliminate duplication in the standardization of such names among the Federal departments and agencies. It is made up of members representing the departments of State, Defense, Army, Navy, Post Office, Interior, Agriculture, Commerce, and Air Force and the Government Printing Office, the Library of Congress and the Central Intelligence Agency.

Results of staff research and actions of the Board and the Secretary are published in the form of gazetteers, transliteration systems, and decision lists. The Department maintains files of about 3 million approved names which are the basis for a names inquiries service rendered to government agencies and the general public.

With an eye to the future, the National Park Service in May 1963 appointed a five-man organization study team to take a careful look at management. The objective was to improve efficiency and effectiveness—to give the park visitor the best service possible.

Reorganization, based on the team report, has been implemented under the following functions: Administration, operations, design and construction, specialized services, resource studies, and cooperative activities.

Service reorganization also marked the beginning of the use of teams for preparing long range master plans. Creative management concepts based on providing perpetual and expanding opportunities for visitor use and enjoyment of park resources forms the basis of the Master Plan program.

Reorganization also resulted in creation of the Division of Federal Agency and State Assistance, to provide professional planning on request to other Federal agencies in the areas of development, administration, archeological and historical interpretive programs and training.

The Park Service's new look includes a unit primarily responsible for resource management. In the field of natural resources, the accent will be on integrity of environment—the sustaining of interrelationships between plants and animals in their original condition. Historical resources will be managed with an eye to continuing the surroundings and the flavor of the period or event for which the area is being preserved. Recreational resource management will aim at providing the widest reasonable range of opportunity for outdoor recreation.

Faced with the welcome new responsibility of active land and resource manager of the Nation's public lands, the Bureau of Land Management completely overhauled its Washington office. Reorganization followed extensive organizational studies, analysis and definition of BLM goals.

Part of the revised look was a new BLM insignia, triangular in shape, depicting in modernistic design the lands, water and renewable resources managed by the Bureau. The emblem signals BLM's emphasis on balanced use of the public lands rather than concentration on special uses.

In the Bureau of Mines, establishment of three new assistant directorships has significantly strengthened programs in three areas—minerals and fuels research evaluation and development of mineral resources, and general administration. The new posts, each entailing immediate responsibility to the Bureau's director, will provide more unified direction of related organizational functions within the Bureau. The positions were created as part of a major Bureau reorganization announced by the Department early in Fiscal 1964 and are aimed at improving efficiency in the use of scientific, engineering and administrative manpower. The positions of Assistant Director—Health and Safety, and Assistant Director—Helium were retained.

The continually increasing responsibilities of the Department in the conservation and utilization of the country's natural resources are reflected in the greater emphasis that is being placed on effective Departmental management. The full success of a resource program depends in no small way on the extent to which the program is efficiently and economically administered.

The Conference on Equal Employment Opportunity in 1963—
led by Secretary Udall, keynoted by then Vice President Johnson.

Two great Congresses

The Endless Search

In a legislation-studded thrust, conservation today is taking on the outlines of a new and profound concept—one that relates every living thing on this planet to the total environment.

A magnificently bipartisan Congress registered this new awareness by passing more than 30 pieces of legislation and earning for the 88th Congress the undisputed right to the title "Conservation Congress."

Among the outstanding achievements of this session and the one immediately preceding it are the Land and Water Conservation Fund, the Wilderness Act, the Water Resources Research Act, the Wildlife Refuge Revenue Sharing Act and the Commercial Fisheries Research and Development Act.

The 87th Congress already had created three National Seashores—the 88th capped the performance by approving Canyonlands National Park and Fire Island National Seashore—the first created from the original public domain in 35 years.

The Open Space Program for land acquisition in urban areas was expanded by the 88th Congress. Open spaces become gems to cherish and preserve when buildings threaten to blot out the sky and exhaust-shrouded freeways lace the land.

Increased leisure, increased income, increased mobility—all combine to make recreation the fourth largest and fastest growing of U.S. industries. Shoulder to shoulder fishing, table to table picnicking, bumper to bumper travel is all that *set an achievement record in conservation*

Photo by M. Woodbridge Williams

will remain of outdoor recreation unless the warning signs on the road to the future are heeded.

Conservation today is providing for outdoor recreation, it is wheeling electricity over mountain ranges and into power-hungry regions, it is joining hands with the rest of the world to find cheap methods of desalting water, it is concern for the total water system, air blanket, ground use pattern.

The Federal Insecticide, Fungicide and Rodenticide Act, the Pesticides Research Act, the Clean Air Act, the Water Pollution Control Act, the Pacific Northwest-Pacific Southwest power intertie and innumerable housing, health, education and economic programs on our Indian reservations and in the Trust Territories—all this is conservation at its highest. But there must be no let-down. Another decade of hard work remains if this new conservation concept is to become a solid, working reality.

Such programs as the reactivated oil shale research could some day unlock trillions of gallons of oil from its rocky prison. A wild rivers study is needed to help us identify sections of rivers and adjacent areas whose highest use to a quality society lies in keeping them as they are. Dozens of prime areas suitable for National Park or National Recreation Area status await the attention of our national legislators, while creeping civilization threatens to preempt them for less noble uses.

In the words of President Johnson:

> "A few years ago we were greatly concerned about the Ugly American. Today we must act to prevent an Ugly America.
>
> "For once the battle is lost, once our natural splendor is destroyed, it can never be recaptured. And once man can no longer walk with beauty or wonder at nature, his spirit will wither and his sustenance be wasted."

The challenge is a worthy one. We cannot afford to give it less than our best effort. Sustained vigilance is the price of quality as well as freedom.

If our parks become progressively crowded with urbanites who long for a glimpse of wildness and natural beauty then they may as well stay home in their choked cities.

Photo by M. Woodbridge Williams

Acknowledgements

Black and White Photo Credits

Standard Oil Co. (N.J.), p. 8, top left; West Virginia Department of Commerce, p. 9, top left; Fred M. Hitchcock, p. 9, top right; William A. Garnett, p. 8, bottom right and p. 9, bottom right and left; North Carolina Wildlife Resources Commission, Photo by Jack Dermid, p. 12, top left and p. 13, center, and p. 36, bottom left; Richmond News-Leader, p. 12, bottom; U.S. Department of Agriculture, p. 13, bottom and p. 30, top left and top right; U.S. Army Corps of Engineers, p. 24, top and bottom and p. 30, bottom left; A. Devaney, Inc., N.Y., p. 33, center right; Detroit Michigan News, p. 36, middle bottom; U.S. Public Health Service, p. 36, bottom right.

Color Photo Credits

Aeroneutronics Division, Ford Motor Co., Ray Atkeson, William Bacon III, Richard Beattie, Jack E. Boucher, Ken Cobean, Herrin F. Culver, John M. Kauffman, Jim Lee, National Aeronautics and Space Administration, Abbie Rowe, Robert N. Taylor, U.S. Department of Agriculture, Brett Weston, M. Woodbridge Williams, Steven Wilson, Jim Yoakum.

Some Other Interior Department Publications of Special Interest

Natural Resource booklet series, states: Nevada, $.45; Massachusetts, $.45; Colorado, $.50; Arizona, $.45; Oregon, $.50; Ohio, $.45; Montana, $.50; Washington, $.50; New Mexico, $.50; West Virginia, $.45; Idaho, $.50. "The Race for Inner Space," $.55 "Reclamation Era," (published quarterly) subscription rates, $.50 a year. "Federal Assistance in Outdoor Recreation," $.20; 1963 Minerals Yearbooks—Vol. 1, Metals and Minerals (Except Fuels), $4.50; Vol. 2, Fuels, $2.50; Vol. 3, Area Report: Domestic $4.25; U.S. Wall Map, $2.00; "Our Public Lands," (quarterly magazine), $.60 annually; "Wildlife on the Public Lands," $.35; Waterfowl Tomorrow $4.00; Attracting Birds, $.15; Shrimp Tips $.25; Take a can of Salmon $.25; "Indian Affairs—A Progress Report" $.15 Answers to Questions about the American Indian $.20; Colonials and Patriots, $2.75; Parks for America $5.25; Geology of Mt. Rainier National Park $1.75; A Primer on Water $.35; A Primer on Ground Water $.25

Send list of book title(s) of publications you wish to purchase to:

The Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

☆ U.S. GOVERNMENT PRINTING OFFICE : 1965 O—747-251

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C., 20402 - Price $1.00

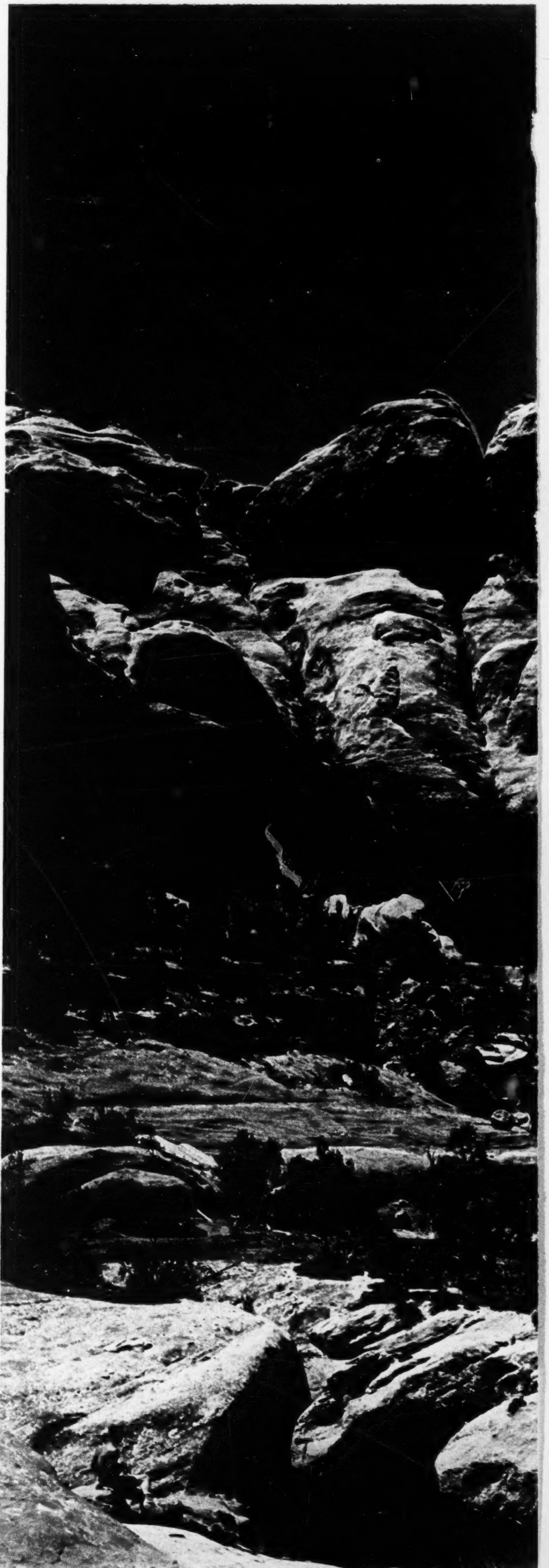


Photo by M. Woodbridge Williams

The Quest as Voiced by the President

"For over three centuries the beauty of America has sustained our spirit and enlarged our vision. We must act now to protect this heritage. In a fruitful new partnership with the states and cities the next decade should be a conservation milestone. We must make a massive effort to save the countryside and establish—as a green legacy for tomorrow—more large and small parks, more seashores and open spaces than have been created during any period in our history.

A new and substantial effort must be made to landscape highways and provide places of relaxation and recreation wherever our roads run.

Within our cities imaginative programs are needed to landscape streets and transform open areas into places of beauty and recreation.

We will seek legal power to prevent pollution of our air and water before it happens. We will step up our effort to control harmful wastes, giving first priority to the cleanup of our most contaminated rivers. We will increase research to learn more about control of pollution.

We hope to make the Potomac a model of beauty and recreation for the entire country—and preserve unspoiled stretches of some of our waterways with a Wild Rivers bill."

From the State of the Union message of President Lyndon B. Johnson, delivered to the joint session of the Congress on January 4, 1965.

U.S. Department of the Interior • Stewart L. Udall, Secretary

March 3, 1849